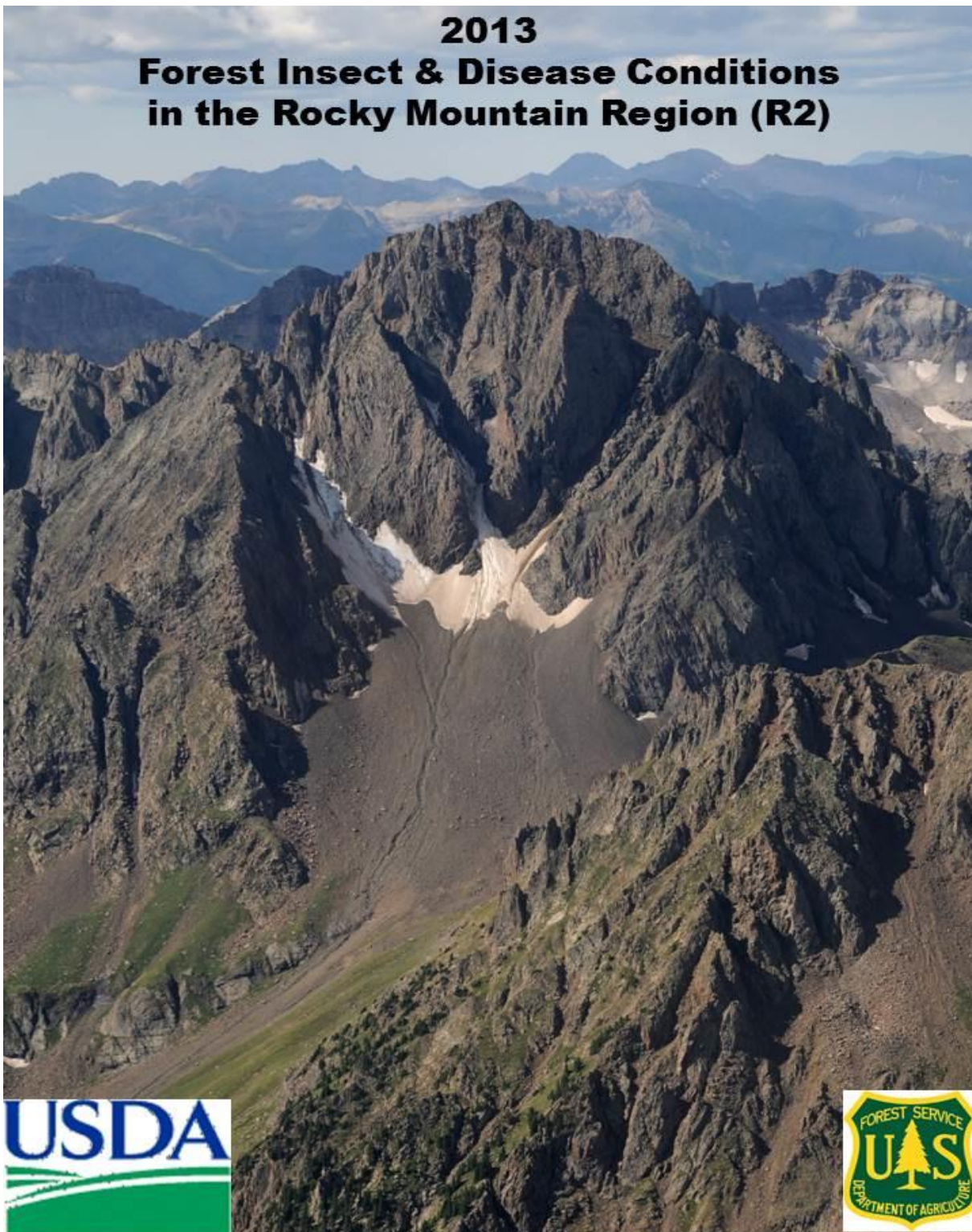


2013 Forest Insect & Disease Conditions in the Rocky Mountain Region (R2)



Cover Photo of Mount Sneffels; a Colorado “Fourteener” Mountain, Ouray County, Uncompahgre National Forest (by Justin Hof, 2013). **USDA Forest Service logos in bottom picture corners.**

2013 Forest Insect & Disease Conditions in the Rocky Mountain Region (R2)

Reference: Harris, J. L. (comp.); R2 FHP staff, and State Forest Health Specialists, 2014. 2013, Forest Insect & Disease Conditions, Rocky Mountain Region (R2). USDA Forest Service. State, Private Forests, Tribal Relations, & Forest Health Protection (SPF-TR-FHP), R2-14-RO-32. 77 pp.

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Due to the nature of aerial surveys, this data will only provide rough estimates of location, intensity and the resulting trend information for agents detectable from the air. Many of the most destructive diseases are not represented in the data because these agents are not detectable from aerial surveys. The maps and data presented should only be used as a partial indicator of insect and disease activity, and should be validated on the ground for actual location and causal agent. The insect and disease data are available digitally from the USDA Forest Service, Region Two Forest Health Management group. The cooperators reserve the right to correct, update, modify or replace GIS products. Using these data for purposes other than those for which they were intended may yield inaccurate or misleading results.

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Information shown is based upon data compiled as of March 2014. References and GPS data provided upon request. For more information, contact R2 FHP, (jerilyn.harris@fs.fed.us) or 303-275-5155).

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Table of Contents for 2013 Conditions Report

Pages

Cover, and Disclaimer	1 - 2
Acknowledgements and Table of Contents	3 - 4
MAJOR DAMAGE AGENTS	5 - 17
Douglas-fir Beetle	5
Dwarf Mistletoes	6
Mountain Pine Beetle	7
Root Diseases	10
Spruce Beetle	11
Sudden Aspen Decline	13
Western Balsam Bark Beetle	14
Western Spruce Budworm	15
White Pine Blister Rust Disease	15
Agents are listed Alphabetically by Common Names	18 - 28
OTHER DAMAGE AGENTS OF CONCERN	
A	Ambrosia Beetle, Ash-lilac Borer, Aspen Leaf Miner, Asian Bush Honeysuckle
C	Cottonwood Borer, Cottonwood Leaf Beetle
D	Diplodia Blight, Douglas-fir Tussock Moth, Dutch Elm Disease
E & F	Emerald Ash Borer, Fir Engraver, Flat-headed Ash Borer
H & I	Gypsy Moth, Ips Engraver Beetles, (Pine Engraver Beetles & Piñon Ips)
L	Large Aspen Tortrix, Lodgepole Pine Terminal Weevil, Leucocytospora Canker
O & P	Oak Decline, Oak Wilt, Pine Wilt & Pinewood nematode, Pine Needle Scale
R & S	Round-headed Pine Beetle, Rusty Tussock Moth, Scale
T & U	Twig Beetles, Thousand Canker Disease, Unknown Abiotic Damage
W & Z	Western Cedar Bark Beetles, Western Pine Beetle, Western Tent Caterpillar, Zimmerman Pine Moth

Appendices Part I and Part II (document attached)	28
Part I – Aerial Survey Highlights and Press Releases for Colorado, South Dakota, and Wyoming	1 - >21
Part II – The 2013 Aerial Detection Survey Summary for the Rocky Mountain Region (R2) of the US Forest Service	22 - > 52

MAJOR DAMAGE AGENTS

Douglas-fir Beetle: (*Dendroctonus pseudotsugae*)

Host Tree: Douglas-fir

Colorado Counties: Archuleta, Boulder, Chaffee, Delta, Dolores, Eagle, Garfield, Gilpin, Grand, Gunnison, Hinsdale, Jackson, La Plata, Lake, Mesa, Montezuma, Montrose, Ouray, Pitkin, Routt, San Juan, San Miguel, and Summit.

In southwestern Colorado, widespread low level mortality occurred across much of the susceptible cover type. Mortality was substantially lower than that observed across the area in the early 2000's. However, increased activity was observed at several locations. Activity increased along the U.S. Hwy 550 corridor north of Durango. Several spots that were monitored in the last 4 years grew from 15-20 trees to 25-30 trees. In addition, the beetle was attacking younger and smaller diameter trees in this area. Colorado State Forest Service personnel noted increased Douglas-fir beetle activity in the Elk Meadows subdivision south of Ridgway, the San Miguel River canyon between Telluride and Placerville, and the West Fork of Cimarron Valley.

In central Colorado, notable ground observations include ongoing Douglas-fir beetle killing older trees in the Chalk Creek drainage between Salida and Buena Vista. Tree losses in subdivisions and private lands in Gunnison County included Blue Mesa Subdivision, Arrowhead Subdivision and the Blue Mesa 40's. Increasing Douglas-fir beetle activity was also noted during ground surveys in the Ute Pass area and in Teller County, north of Divide.

Further north, large pockets of tree mortality (5-20) caused by Douglas-fir beetle were identified in South Turkey Creek Canyon, especially on Mount Lindo. Pockets of 5-10 trees killed were located on the Pike National Forest along the North Fork of the South Platte River from Foxton Road to Buffalo Creek. Smaller pockets (1-5) were also noticed in the Indian Hills area, near Highway 126 south of Pine Junction, and in the Deer Creek Canyon/Critchell area. Small pockets of Douglas-fir beetle tree mortality continued to be noted west of Boulder and in the Allenspark area.

Douglas-fir beetle continued to be active in a few isolated areas of Grand County. Activity was noted west of Granby and north of Kremmling. Douglas-fir beetle has active in these areas for several years. Activity remained at 1-5 trees per acre per year. Douglas-fir beetles continued to be active in proximity to Steamboat Springs. Colorado State Forest Service foresters coupled sanitation harvest with a "push and pull" pheromone strategy to address some of the beetle activity. Thousands of beetles were captured in June-July with this strategy. A few isolated infested trees were found in other places south of Steamboat Springs. In addition, Douglas-fir beetles were recently found at the State Forest while conducting water quality monitoring.

In western Colorado, some areas have experienced Douglas-fir beetle activity for the last 5-10 years; patches of mortality continued to grow, though not aggressively. The areas most

affected were the north slopes of the Roan Plateau east to Glenwood Springs, the Crystal River drainage, and the upper North Fork of the Gunnison.

Wyoming Counties: Big Horn, Carbon, Fremont, & Hot Springs.

Douglas-fir beetle caused mortality of Douglas-fir at relatively low levels in Wyoming. Small pockets of activity or single tree attacks were noted from around the state. MCH (an anti-aggregation pheromone) continued to be used to protect high value trees in areas of ongoing activity in northwestern Wyoming.

For more information, maps, and population graphs of Douglas-fir beetle in Colorado or Wyoming, please see Appendices Part I & II.

Dwarf Mistletoes: (*Arceuthobium* spp.)

Host Trees: Douglas-fir, Bristlecone Pine, Limber Pine, Lodgepole Pine, Piñon Pine, Ponderosa Pine, & Whitebark Pine

Colorado Counties: Chaffee, Clear Creek, El Paso, Jackson, Jefferson, Lake, Larimer, Montrose, Ouray, Park, Routt, San Miguel, & Teller.

Dwarf mistletoe infections were the most serious and damaging disease problems in the Rocky Mountain Region.

Following are ground survey results from the districts of the Colorado State Forest Service: Salida District - at the base of Mt Princeton, just north of Chalk Creek, tree mortality caused strictly by dwarf mistletoe was noticeable.

Alamosa District - dwarf mistletoe pockets occurred throughout valley, mostly on ponderosa pine.

Woodland Park District - dwarf mistletoe was observed across the district and was the most damaging agent. Trees showed significantly more stress than in previous years.

Montrose District - south of Ridgway, specifically on Miller Mesa & Burnt Mill Mesa, are stands with heavy infestations of dwarf mistletoe which caused tree stress. This may be directly correlated to most of the additional mountain pine beetle spots in this area.

Steamboat Springs District - dwarf mistletoe infections continued to be moderate to severe in Routt and Jackson counties.

Golden District - levels of dwarf mistletoe infections varied considerably across the District. It was found in both ponderosa and lodgepole pines. Dwarf mistletoe infections tended to be most severe on sites with poor soils or limited water availability. The Evergreen area has numerous pockets of heavy dwarf mistletoe infestation in ponderosa pines. Another area of concern is in Golden Gate Cañon, within the Golden Gate Canyon State Park, dwarf mistletoe is infecting both lodgepole and ponderosa pines. Also, a very small amount of Douglas-fir dwarf mistletoe (*Arceuthobium douglasii*) was observed in Golden Gate Canyon State Park.

Fort Collins/Fort Morgan District - Dwarf mistletoe infections were extremely widespread throughout Larimer County in lodgepole pine and ponderosa pine. It is best characterized as a chronic and persistent forest health problem. Given the severity and extent of the recent MPB

epidemic and wildfires, the focus of most active management is on mitigating the impacts rather than controlling dwarf mistletoe.

Mountain Pine Beetle (*Dendroctonus ponderosae*)

Host Trees: Lodgepole Pine, Ponderosa Pine and 5-needle/white Pines (Bristlecone, Limber, & Whitebark).

Mountain pine beetle populations declined across much of the Rocky Mountain Region, however, localized areas were still seeing steady or increasing activity.

Colorado Counties: Boulder, Clear Creek, Delta, Dolores, El Paso, Garfield, Gilpin, Gunnison, Hinsdale, Jackson, Jefferson, La Plata, Larimer, Mesa, Montezuma, Montrose, Ouray, Park, Pitkin, Routt, San Juan, San Miguel, & Teller.

Mountain pine beetle populations in northern and central Colorado declined significantly within lodgepole pine stands along the southern flank of the area impacted in the past 15+ years. Hundreds of thousands of acres of suitable hosts remain south of the main epidemic area, yet the populations have not expanded there.

Populations increased within ponderosa pine stands in a number of counties in the southern Colorado, most notably on the Uncompahgre Plateau (San Miguel and Montrose Counties). Small to moderate-size pockets of mountain pine beetle were detected on private land south of U.S. Hwy 160 between Durango and Mancos. There was also an increase in mountain pine beetle activity in dwarf mistletoe-infected ponderosa pine just south of Ridgway, specifically on Miller Mesa and Burnt Mill Mesa.

Jackson County continued to see pockets of newly hit lodgepole pine; however, the overall tree mortality in the area is declining.

Mountain pine beetle activity was noted in ponderosa pine over much of Jefferson County. Pockets of 3-15 trees killed by mountain pine beetle were noted in Coal Creek Canyon, Indian Hills, Evergreen, Conifer, Pleasant Park Road, Deer Creek Canyon, South Turkey Creek, North Turkey Creek, Turkey Creek Canyon, and Staunton State Park.

In the northern Front Range, many lodgepole and ponderosa stands that lost a lot of trees to mountain pine beetle in recent years still contained a significant component of living trees. In many cases the larger diameter classes were taken out, leaving the smaller trees. However, there were many large trees that were not killed. At this point, the result of the mountain pine beetle epidemic seems different than what occurred on the west slope, where entire landscapes of mature lodgepole pine were nearly completely decimated. This epidemic is not over, but it appears that more diverse forest structure and greater tree species diversity on the eastern slope and in the Foothills have resulted in stands that are more resilient to mountain pine beetle.

In northern Colorado, mountain pine beetle has impacted ponderosa pine most significantly at its lower elevation limit. Adequate stocking levels there may not be achieved for some time. However, stands at higher elevations show better signs of ponderosa pine regeneration.

Nebraska:

Mountain pine beetle activity was much reduced in 2013. No live adults or larvae were found during ground surveys. Beetle populations in western Nebraska forests seemed to have returned to the low levels that existed prior to the 2009 outbreak. Monitoring for the beetle will continue.

South Dakota Counties: Custer, Fall River, Lawrence, Meade, & Pennington

Elevated levels of ponderosa pine mortality continued in the Black Hills of western South Dakota and northeastern Wyoming. Some hotspots still exist, particularly in the Northern Hills. Yet, there were many areas where mortality appeared to be static based on ground transect surveys. There were also areas of declining activity. The Black Elk Wilderness Area bordering Custer State Park had experienced near 100 percent mortality by 2012. Custer State Park has seen less pine mortality due to a multitude of management tactics such as thinning stands to reduce susceptibility, sanitation, and cutting the infested trees into short sections and leaving them in place. While the epidemic has been held in check in the Sylvan Lake Unit of Custer State Park, there were a number of spot infestations that occurred in the western portion of the main body of Custer State Park. Approximately 30,000 trees were infested in 2013. This was a reduction from 2012, when approximately 35,000 infested trees were found and from 2011 when more than 120,000 infested trees were detected. The infested trees have either been harvested or the boles were cut into short sections (2 feet or less) and left in place, a treatment commonly referred to as “cutting and chunking.” The dominant treatment of infested pines conducted by landowners and the county crews was cutting and chunking, conducted ideally between October 1 and March 1. One study found that if infested trees were cut during this time period and at this length, or shorter, the beetle mortality was about 75% higher compared to standing infested trees. In addition, infested pockets did not expand afterwards (Ball and Taecker. 2013). Cutting later in the season or in longer lengths did not achieve the same mortality (Ball *et al.*, 2013), *Cutting infested pines into unpeeled sections: a population-reduction tactic for managing mountain pine beetle in the Black Hills.*

There is a relic stand of limber pine in Custer State Park that has been crowded by an overstory of white spruce, infected by white pine blister rust and threatened by mountain pine beetle. The anti-aggregation pheromone, verbenone, was used as part of the management of this stand. The efforts were very successful, with the loss of only 3 percent of the trees to mountain pine beetle. While no controls were in place to determine the effectiveness of verbenone on limber pines, the only limber pines killed by mountain pine

beetle were the five that were not treated with verbenone ($x = 4$) or were isolated trees ($x = 1$). The ponderosa pines in these same stands have suffered about 90 percent mortality from mountain pine beetle.

Wyoming Counties: Albany, Carbon, Converse, Crook, Fremont, Hot Springs, Laramie, Natrona, Niobrara, Park, Platte, Sweetwater, & Weston.

In western Wyoming (Park, Hot Springs and Fremont counties) in the Absaroka and Wind River mountains, localized heavy mortality of lodgepole, whitebark, and limber pine was observed. Host depletion led to a decline of mortality in heavily impacted stands.

In central Wyoming's Rattlesnake Hills of Natrona County, limber pine mortality was detected on the north face of Goat Mountain, the east face of Bald Mountain, and in French Rocks. Limber pine mortality was also scattered east of North Dry Creek Road and west of Garfield Peak. On the north face of Casper Mountain, scattered single-tree and multi-tree spots were observed. Very low mountain pine beetle activity was seen in the Pine Ridge area of Natrona and Converse counties and the Miller Hills in Converse County.

The Antelope Hills and Steamboat in north Sweetwater County had low to medium mountain pine beetle activity.

Populations were down to endemic levels in Niobrara County and Laramie County, where scattered ponderosa pine mortality was detected in and near Curt Gowdy State Park.

Very low levels of mountain pine beetle persisted primarily in limber pines in the Shirley Mountains, Seminole Mountain, Pedro Mountains and Ferris Mountains, as well as Jep Canyon and the Atlantic Rim areas of Carbon County.

In Albany County, low levels of ponderosa pine mortality were observed east of Vedauwoo Road up to the Albany and Laramie County boundary.

Glendo State Park, in Platte County, had single-tree hits of ponderosa pines observed in Morris Canyon and in Red Hills Campground. There were single-tree hits of ponderosa pine on the west-facing shoreline on the east edge of the park, south of Narrows Bluff. Single-tree ponderosa pine hits occurred east of Glendo Reservoir and west of Morris Canyon. There were also single-tree ponderosa pine hits east of Interstate 25 and west of the Platte River, between Glendo Reservoir to the north and Highway 26 to the south.

For more information, maps, and population graphs of Mountain Pine Beetle in Colorado, Nebraska, South Dakota, and Wyoming, please see Appendices Part I & II.

Root Diseases: (*Armillaria* spp. & *Ganoderma* spp.)

Host Trees: Norway Maple, Silver Maple, Pin Oak, Austrian Pine, Limber Pine, Lodgepole Pine, Ponderosa Pine, Whitebark Pine, Douglas-Fir, Engelmann Spruce, Subalpine Fir, & Quaking Aspen

Kansas: Morris County

Nebraska Counties: Cherry, Dawes, Sioux, and Thomas,

Armillaria root rot was seen on hardwoods and some planted pine species throughout Kansas. These declining trees may have increased root disease symptoms due to the stress from prolonged drought and possible root injury. *Armillaria* root disease was seen on maple spp., oak spp., elm, and some planted pine species. Much was seen in Kansas' eastern oak-hickory woodlands or where native oak stands once lived. This may be a contributing factor to oak decline occurring in Kansas.

South Dakota Counties: Custer, Fall River, Lawrence, Meade, and Pennington.

Wyoming Counties: Big Horn, Crook, Fremont, Hot Springs, Johnson, Park, Sheridan, Sublette, Washakie, and Weston.

Armillaria root disease was considered the most important root disease in Western South Dakota and Central and Eastern Wyoming. In a recent study of *Armillaria* root disease in Wyoming, four species of *Armillaria* were identified. *Armillaria solidipes* (= *A. ostoyae*) was the most common. The other species of *Armillaria* in WY were *A. sinapina*, *A. gallica*, and *A. cepistipes*. All four species caused root disease.

White mottled rot (*Ganoderma applanatum*) was found almost exclusively on aspen and was quite common in the Black Hills and Wyoming forests. *Ganoderma lucidum* was found on hardwoods.

Spruce Beetle: (*Dendroctonus rufipennis*)

Host Trees: Blue Spruce & Engelmann Spruce

Colorado Counties: Alamosa, Conejos, Costilla, Delta, Dolores, Eagle, Grand, Gunnison, Hinsdale, Jackson, La Plata, Larimer, Mesa, Mineral, Montezuma, Montrose, Ouray, Rio Grande, Routt, Saguache, San Juan, San Miguel, and Summit.

Significant spruce beetle activity continued in southwestern Colorado, occurring primarily on San Isabel, San Juan, Rio Grande and Grand Mesa-Uncompahgre-Gunnison National Forests, Bureau of Land Management and surrounding lands. Activity was substantial north and eastward on both sides of the Continental Divide, with significant spruce mortality evident from the Weminuche Wilderness, north to Monarch Pass. Activity had also increased substantially in the Sangre de Cristo Mountains, east of the San Luis Valley.

In areas of greatest impact, Engelmann spruce mortality is evident from approximately 9,500 feet up to 12,000 feet (timberline) . In these areas, infested trees as small as 4 inches DBH were common. Large numbers of lodgepole pine in the proximity of Engelmann spruce were also attacked by bark beetles. Efforts are ongoing to determine if lodgepole pine was infested by spruce beetle, or possibly by its very similar relative, the lodgepole pine beetle (*Dendroctonus murrayanae*).

Spruce beetle populations continued to grow in southern and central Hinsdale County, impacting a few housing subdivisions and private lands south of the Continental Divide. Ptarmigan Meadows and S-Lazy-U subdivisions continued to remove and treat standing dead and currently infested trees. The Papoose Fire of the West Fork Complex resulted in extreme fire behavior in June 2013, due to the heavy fuel load of recently killed Engelmann Spruce

Large spruce beetle populations in the San Juan's Mountains have spilled over Slumgullion Pass and are nearing private land surrounding Lake City. Communities around Lake City continued planning efforts in preparation for spruce beetle. Most communities and private lands surrounding Lake City and along the Lake Fork of the Gunnison River, contain large numbers of mature blue spruce. The town of Lake City, as well as many private residents, began spraying individual trees for spruce beetle protection. This effort will likely continue in 2014.

Almost the entire area of Mineral and eastern Hinsdale Counties had been affected by this outbreak. Ground surveys found that few if any Engelmann spruce trees larger than 6" DBH have survived. Public concern builds as this beetle epidemic continues to impact more populated areas.

Spruce beetle activity has intensified significantly in the past few years on Wolf Creek Pass, including Wolf Creek Ski Area. Westward, as documented by aerial survey, there were pockets of spruce beetle activity in the spruce-fir type north of Durango and in the Rico area north of Dolores.



Figures A & B. Engelmann spruce trees killed by spruce beetle on the Rio Grande National Forest in Colorado (**A**); photo by Brian Howell. Spruce trees damaged by spruce beetle at Sublette Peak on the Shoshone National Forest in Wyoming (**B**); photo by Al Dymerski.



Spruce beetle populations were developing along the U.S. Hwy 550 corridor between Durango and Ouray, including Coal Bank, Molas, and Red Mountain Passes, and along the U.S. Hwy 145 corridor over Lizard Head Pass.

In northern Colorado, spruce beetle continued to have a minor presence in 2013. Continuations of minor outbreaks were observed in the Troublesome drainage in northern Grand County, as well as some individual spruce trees in southern Summit County. Areas of infestation continued to be small, about 1 tree per acre.

Spruce beetle was still present in North Routt, over Rabbit Ears Pass and on the Colorado State Forest. The occurrence was more widespread than that reported in 2012. Mortality was evident at all elevations, but seemed to be impacting the higher elevations more so than the lower elevations.

Spruce beetle started showing up in small pockets and individual scattered trees on Grand Mesa in 2009. There has been a significant increase in spruce beetle damage in subsequent years, with widespread and larger pockets of mortality. The infestation continued to intensify in 2013. The US Forest Service continued sanitation and salvage efforts there.

In the northern Front Range, Engelmann spruce mortality from current infestations were widespread in the Crown Point and Laramie River areas of western Larimer County. Most of the impacted forest was in the Arapahoe-Roosevelt National Forests.

Wyoming Counties: Big Horn, Fremont, Johnson, Park, Sheridan, Sublette, and Washakie
Substantial spruce mortality continues where hosts have not been depleted, as in the Absaroka Mountains. Spruce mortality increased slightly in the Big Horn Mountains and the Wind River Range. Ground observations in the Togwotee Pass area identified numerous 2013 mass attacks on Engelmann Spruce.

For more information, maps, and population graphs of Spruce Beetle in Colorado or Wyoming, please see Appendices Part I & II.

Sudden Aspen Decline (SAD) host tree: quaking aspen

Numerous counties and district offices of the Colorado State Forest Service reported several aspen stands in southwestern Colorado still having problems with Sudden Aspen Decline. In Wyoming, two counties also had some Sudden Aspen Decline occurring.

Colorado Counties: Delta, Mesa, Montrose, Ouray, Pitkin, and San Miguel

Recent quaking aspen tree mortality due to SAD continued to be moderate the Grand Junction area. The 2013 aerial detection surveys showed many SAD areas appearing to be “re-greening or regenerating aspens” from the previous damage, particularly at higher

elevations. However, a remeasurement of permanent plots in southwestern Colorado indicated that while SAD is not continuing to spread to new areas, clones impacted in the early 2000's are continuing to decline. Similarly, SAD in the Montrose area seemed to be subsiding. While it was still noticeable, it did not seem to be expanding in acreage.

Lower elevation and drier sites seemed to be most affected by SAD; particularly on the Roan Plateau, Uncompahgre Plateau, Pinyon Mesa, and the south side of Grand Mesa. Many aspen clones on the Roan Plateau and Pinyon Mesa are completely dead now, with little evidence of sprouting from aspen roots. Woodboring beetles are increasingly apparent in many declining clones.

Wyoming Counties: Carbon & Natrona.

All aspen forested areas located in west Sweetwater County in Wyoming were recorded with low SAD intensities including: Miller Hill; Ram Canyon; Separation Peak; Scotty Canyon; Jep Canyon; Snowshoe Canyon; and Atlantic Rim.

There were also low levels of aspen damage in Natrona County on Casper Mountain (northwest of the Muddy Mountain Road and South Circle Drive intersection).

Western Balsam Bark Beetle (*Dryocoetes confusus*)

Host Tree: Subalpine Fir

Colorado Counties: Boulder, Delta, Gilpin, Gunnison, Hinsdale, Jackson, Mesa, Montrose, Ouray, Pitkin, Routt, and San Miguel

Wyoming Counties: Carbon and Natrona

Significant levels of activity were evident throughout much of the subalpine fir. While most of the actual subalpine fir mortality was attributed to western balsam bark beetle, this activity was often pre-disposed by *Armillaria* root disease. There was an overall statewide decrease in western balsam bark beetle in Colorado, but this varied greatly by county.

Areas most affected by western balsam bark beetle increased statewide in Wyoming.

However, beetle populations remained low in both Wyoming and Colorado.

Western Spruce Budworm (*Choristoneura occidentalis*)

Host trees: Blue Spruce, Engelmann Spruce, Douglas-Fir, Subalpine Fir, & White Fir

Colorado Counties: Alamosa, Archuleta, Clear Creek, Conejos, Costilla, Custer, Dolores, Fremont, Huerfano, Jackson, Jefferson, La Plata, Las Animas, Mineral, Montezuma, Montrose, Ouray, Pueblo, Rio Grande, Routt, Saguache, San Juan, San Miguel.

Wyoming, Park County

Colorado:

Infestations continue on the San Isabel, Rio Grande and San Juan National Forests and surrounding lands. Colorado State Forest Service Districts report significant impact in Costilla County around La Veta Pass in white fir and Douglas-fir. Conejos Canyon in Conejos County has minor occurrences. Saguache County towards Poncha Pass has shown an increase as well. This defoliation has been continuous since about 2005. Spruce budworm damage in Custer County along the Sangre de Cristo range was much less this year. The reduction in activity is believed to be weather related.

In northern Colorado, western spruce budworm was observed in much greater numbers in southern Routt County, specifically in the Green Ridge State section where heavy defoliation has been observed throughout the parcel on both spruces and subalpine firs.

There are several moderate pockets of western spruce budworm in southern Jefferson County, especially along Deer Creek Canyon Road and lower Pleasant Park Road. Light infestations were noted near Conifer along Kuester Road, and Black Hawk/Foxton Roads. Defoliation was also noted on Shadow Mountain and Bear Mountain.

Wyoming:

Annual aerial surveys and ground observations show a continued increase of areas with visible heavy defoliation in the Clarks Fork of the Yellowstone River on the Shoshone National Forest.

White Pine Blister Rust Disease (*Cronartium ribicola*)

Host Trees: Bristlecone Pine, Limber Pine, Southwestern White Pine, Whitebark Pine

White pine blister rust (WPBR) continues to spread slowly and intensify in the Rocky Mountain Region.

Colorado Counties: Alamosa, Boulder, Custer, El Paso, Huerfano, Larimer, Pueblo, & Saguache.

Blister rust was first discovered in Colorado in 1998 on limber pines near the Wyoming border in Larimer County. In October 2003, isolated infestations were discovered in the Sangre de Cristo Mountains on both limber pine and Rocky Mountain bristlecone pine. They were also confirmed in the Wet Mountains on limber pine. In 2006, the disease was identified on several limber pines near Ward, CO. In 2009, several infected limber pines were identified in Rocky Mountain National Park and on the north slopes of Pikes Peak.

All infected branches identified within Rocky Mountain National Park were pruned and have since been surveyed annually. No new infections were found in the Park in 2013. Little is known about the incidence of the disease on Pikes Peak, as the area has not been extensively surveyed.

WPBR has never been reported in southwestern Colorado; but scattered white pine stands in the area are being monitored.

Decline and mortality are occurring in limber and whitebark pine populations on the Arapaho-Roosevelt, Bighorn, Medicine Bow, Pike-San Isabel, Rio Grande, and Shoshone National Forests; on BLM lands in central Wyoming (Ferris, Shirley, and Green Mountains, and Rattlesnake Hills); and within the Great Sand Dunes National Park and Preserve. Infected bristlecone pines have also been observed within the Great Sand Dunes Park and Preserve. The combined impacts of WPBR and mountain pine beetle, remain a concern for limber and whitebark pine populations in northern Colorado and throughout Wyoming. Forest Health Protection has installed long-term monitoring plots to evaluate pest trends and impacts of WPBR and other damaging agents in five needle pine stands.

South Dakota Counties: Custer & Pennington-

WPBR was discovered in South Dakota in relic stands of limber pine in the Cathedral Spires area of Custer State Park in the 1990s and on limber pine near Harney Peak in the Black Hills National Forest in October 2011. WPBR cankers are present on branches and some stems of trees in these areas and some pine tree mortality continues to occur. Verbenone pouches are being used on both populations for mountain pine beetle reduction.

In Custer State Park, a survey of the limber pines revealed only one new infection in 2013. Pruning has been performed in past years to manage the spread of the disease.

Wyoming Counties: Albany, Big Horn, Carbon, Converse, Fremont, Hot Springs, Johnson, Natrona, Park, Sheridan, Washakie.

In Wyoming, mortality was occurring on limber and whitebark pine trees and regeneration. The disease continues to intensify and spread into previously uninfected stands. The incidence of WPBR is lowest (<5%) in southern Wyoming in the Medicine Bow and Sierra Madre Mountain Ranges.

However, MPB impacts are significant throughout the state wherever white pines grow and the resource is not yet depleted. A study in the Bighorn National Forest found that MPB incidence was positively correlated with WPBR branch canker severity and stem canker incidence. MPB infested trees also had higher incidences of branch cankers and stem cankers compared with non-infested trees (64% and 42% versus 49% and 18%, respectively).

Many limber pines in the Rattlesnake Hills, Green Mountain, Shirley Mountains, and Ferris Mountains in central Wyoming have been killed by MPB and rust disease. Bark beetle populations remain high in these areas and decline and mortality caused by WPBR is also substantial in trees and regeneration.

Whitebark pines in the Shoshone NF are weakened by this rust disease and are succumbing to MPB attacks.

OTHER DAMAGE AGENTS OF CONCERN shown in a series of tables-

Listed Alphabetically by Common Names

A: Ambrosia Beetle, Ash/Lilac Borer, Asian Bush Honeysuckle

Ambrosia Beetles (<i>Platypus spp.</i>)	Host: Black Walnut Kansas
Doniphan County, Kansas had an outbreak of ambrosia beetles near the Kansas and Missouri border. Areas with a heavy composition of black walnut along the Missouri River were attacked by ambrosia beetles in Spring 2013. This area was likely flooded for the growing season in 2011, and then possibly heat stressed in 2012.	
Ash Borer / Lilac Borer (<i>Podosesia syringae</i>)	Hosts: Green Ash, White Ash Kansas
Many urban plantings and shade trees in rural landscapes were hit hard by the ash lilac borer. Most of these plantings were drought stressed. Many of the trees were young (<15 yrs). This occurred all across Kansas from east to west, in urban and rural landscapes.	
Asian Bush Honeysuckle (<i>Alliaria petiolata</i>)	An Invasive Bush Kansas
Lyon, County - The eastern 1/3 of Kansas had pockets of isolated acreage infested with garlic mustard (<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande). These noxious weeds occur within woodlots and forestland preventing natural growth and revegetation of forest lands.	

C: Cottonwood Borer, Cottonwood Leaf Beetle

Cottonwood Borer (<i>Plectrodera scalator</i>)	Host: Plains Cottonwood Wyoming
In Guernsey State Park in northeast Platte County – approximately 13 acres of cottonwood mortality on the northwest shoreline of the Park was observed where the reservoir transitions into the North Platte River. Also in Platte County, 400 acres of cottonwood mortality were observed at Cottonwood Creek, and east of Interstate 25 and west of Cottonwood Road. The mortality agent was not known and may be due to a complex of insect and disease in response to drought stress (Cottonwood Decline).	
Cottonwood Leaf Beetle (<i>Chrysomela scripta</i>)	Host(s): Narrowleaf Cottonwood, Willow Spp. Colorado
An infestation of cottonwood leaf beetle in both narrowleaf cottonwood and willow was observed along the riparian areas of the Rio Grande River in Rio Grande and Alamosa Counties.	

D: Diplodia Blight, Douglas-fir Tussock Moth, Dutch Elm Disease

Diplodia Canker/Blight (<i>Sphaeropsis sapinea</i>)	Hosts: Austrian Pine, Ponderosa Pine, Scotch Pine Kansas, Nebraska, and South Dakota
Diplodia continued to kill and damage many pines in the Great Plains in 2013 in both urban and rural landscapes. Mortality and damage most often occur on Austrian and ponderosa pines. Stressed trees were more susceptible to the disease, such as those affected by drought and overcrowded stands. Urban landscape trees that were poorly planted and had little care were very susceptible to infection by Diplodia. Infected areas were usually heavily impacted by hail before symptoms became evident.	
Douglas-fir Tussock Moth (<i>Orgyia pseudotsugata</i>)	Host: Douglas-Fir Colorado
Defoliation in Douglas-fir continued along the Rampart Range in 2013. Delta traps were installed over 9 locations on the Rampart Range to monitor moth activity. Seven locations had a moderate to significant number of Douglas-fir Tussock moths captured. Some locations were at an “outbreak level”, with over 25 moths captured in each trap.	
Dutch Elm Disease (<i>Ophiostoma novo-ulmi</i>)	Host: American Elm Nebraska
Dutch elm disease continued to cause mortality in American elms in many parts of the state, particularly in riparian areas and in communities.	

E & F: Emerald Ash Borer, Fall Canker Worm, Fir Engraver, Flat-headed Ash Borer

Emerald Ash Borer (EAB) (<i>Agrilus planipennis</i>)	Hosts: Blue Ash, Green Ash, White Ash, Ash spp. Colorado and Kansas
<p><u>Colorado</u> - USDA APHIS dendrochronology studies of 15 trees removed from Boulder’s CU East Campus site estimated that EAB had been present in Boulder County for 3 to 4 years. More study will be done to determine the age of the infestation. Delimitation surveys are continuing.</p> <p><u>Kansas</u> - Wyandotte & Johnson counties went under quarantine in August 2012, following the detection of EAB at the south end of the dam on Wyandotte Lake. By July 2013, an adult beetle was confirmed in Johnson Co. It is believed to have been present up to 5 years, due to natural movement from Missouri, which had a larger area with heavily infested trees near the Kansas and Missouri border.</p>	
Fall Cankerworm (<i>Alsophila pometaria</i>)	Host: Gambel Oak Colorado
Fall Cankerworm, which severely defoliated Gambel oak in 2012, was still present. But, populations appeared to be declining. FHP will continue to monitor this insect in Arapahoe and Douglas Counties in 2014.	

Fir Engraver (<i>Scolytus ventralis</i>)	Host(s): Fir Spp., White Fir Colorado
<p>Large diameter, white fir trees were dying in increasing numbers due to fir engraver infestation. Many of these dead and dying trees were within or adjacent to the community of Ouray, CO. Douglas-fir mortality from Douglas-fir beetle is also evident in proximity to Ouray.</p> <p>Significant fir engraver activity was also recorded in the vicinity of Pagosa Springs, within Archuleta County. Mortality of white fir increased in southwestern Pueblo county due to fir engraver beetles. Fir engraver was also active in Custer County; both in the Wet Mountains and in the Sangre de Cristo Range. In the Durango area, the number of white fir infested by fir engraver beetle seemed to drop off in recent years, but the 2013 drought may result in increased activity in 2014.</p>	
Flatheaded Appletree Borer (<i>Chrysobothris femorata</i>)	Host(s): American Basswood, Black Walnut, Maples, Poplars, Fruit Trees Kansas
<p>Young (<10 yrs) or newly planted trees were heavily attacked in urban areas and rural communities. Rural shade tree plantings and even established trees were succumbing to drought and this secondary pest. Entire deciduous windbreaks were killed throughout Kansas by flat-headed appletree borer. Many of the trees affected were apple, pear, peach, hawthorn, maple, boxelder, hickory, oak, sycamore, black walnut, hackberry, & poplar.</p>	

H & I: Hypoxylon Canker, Ips Engraver Beetles, (Pine Engraver Beetle – Piñon Ips)

Hypoxylon Canker of Oak (<i>Biscogniauxia atropunctata</i>)	Host (s) Black Oak, Bur Oak, Northern Red Oak Kansas
<p>Stress events such as drought allowed Hypoxylon cankers to take advantage of weakened trees. In Kansas, oaks in the red oak group (red and black oaks) tend to be more susceptible to Hypoxylon canker than white oaks.</p>	
Ips Engraver Beetles (<i>Ips</i> spp.) <i>Ips confusus</i> , <i>I. woodi</i> , <i>Ips calligraphus</i> , <i>Ips pini</i> , and <i>Ips grandicollis</i>	Host(s): Limber, Lodgepole, Piñon, Ponderosa, & Rocky Mountain Bristlecone Pines Colorado, Nebraska, South Dakota, and Wyoming
<p>Colorado: High levels of piñon pine mortality started in 2012, and continued in 2013. Outbreaks occurred from Colorado Springs, south along the foothills, from Salida, along the Arkansas River Valley, and southeast of Cañon City. Some of the mortality recorded as piñon <i>Ips</i> (and piñon mortality) during the 2013 Aerial Detection Survey, was actually piñon twig beetle, <i>Pityophthorus</i> spp. In addition, some damage to piñon trees along the Arkansas River in Chaffee County was identified as a piñon tip moth (<i>Dioryctria</i> spp.)</p> <p>Other notable areas with piñons damaged by <i>Ips</i> beetles were reported by the Colorado State Forest Service within the Durango and Grand Junction Districts. Public concern was high as increasing tree mortality spread into parts of La Plata County. The wetter conditions in 2013 moderated some of the <i>Ips</i> activity.</p> <p>Concern about piñon mortality continues near Glade Park and Carbondale. Landowners were cautioned to be careful with cutting activity during the growing season if <i>Ips</i> beetle</p>	

activity was nearby.

Ips woodi continued to cause damages in Park County on **Rocky Mountain bristlecone pine** that was injured during the May 2011 Snyder Creek fire. However, only two fire-injured trees succumbed to attack/infestation by *I. woodi* and associated *Pityophthorus* bark beetles in 2013.

Colorado State Forest Service districts reported average levels of *Ips* beetle-caused damage and mortality in **ponderosa pine** and **lodgepole pines** along the Front Range. Some of this was due to overstocked stands and persistent drought. Increased *Ips* beetle activity occurred in the tops of ponderosa pine near Durango, especially in the Cherry Creek area along U.S. Hwy 160 between Hesperus and Mancos. This was an area where *Ips* activity had previously been evident in dry years. Because activity was confined to the tops of tall trees, the species of *Ips* was not determined.

The Granby District reported trees being attacked by *Ips* or twig beetle; some of these areas of infestation were 40-100 acres in size. In 2013 several new areas of infestation were identified and these will probably remain active for a season or two and then fade away. Inspections of past outbreaks indicate this to be a common pattern.

Nebraska: A complex of *Ips* species, including *Ips calligraphus*, *Ips pini*, and *Ips grandicollis* caused significant mortality and damage in **ponderosa pine** in the Niobrara and Snake River valleys of north-central Nebraska in 2013. In some stands, more than half of the trees were killed by the beetles. Drought stress and in some cases, improper handling of logging slash, contributed to these outbreaks.

South Dakota: Pine engraver beetle (*Ips pini* and *Ips calligraphus*) populations that were very low, increased dramatically beginning in 2012 and caused **ponderosa pine** mortality in the Black Hills. In the southern counties (Fall River and Custer), *Ips* populations also increased in the Pine Ridge country of Shannon County. Pine engraver beetles were typically found in dying trees and slash piles, but the populations expanded and became a significant cause of tree mortality.

Ips beetle populations increased in the early 2000s due to an increase in susceptible host material resulting from wildfires and weather events, such as hail and snow-breakage. This caused a tremendous buildup of dead, weakened and damaged tree material.

Ips populations increased again because of the number of trees killed by the mountain pine beetle and the aftermath of the 2011-2012 droughts. Another factor was the chipping of slash following thinning operations. There was an increase in pine mortality in stands where the fresh slash was chipped in early spring. A high population of *Ips* are expected in 2014, due to the number of pines with snapped tops following the 2013 October snow storm.

Wyoming: Garnet Hill, in northwest Goshen County, had *Ips* beetle damage on approximately 9 acres. Campbell County had about 10 acres of *Ips* activity near Sawmill Creek, south of Hells Canyon Draw.

Losses of **limber pine** to *Ips woodi* were observed in the Sherman Mountains, approximately 12 miles east of Laramie, WY. *I. woodi* remained at high population levels in this area due to the abundance of limber pines already damaged by white pine blister rust disease and a severe mountain pine beetle epidemic.

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L: Large Aspen Tortrix, Lodgepole Pine Terminal Weevil, Leucocyctospora Canker

Large Aspen Tortrix (<i>Choristoneura conflictana</i>)	Host: Quaking Aspen Colorado
Large Aspen tortrix occurred throughout the native Rocky Mountain aspen stands. Increasing populations were noted in 2013 in southern Colorado. At numerous locations on the San Isabel, San Juan and Rio Grande National Forests, large aspen tortrix and western tent caterpillars were evident within the same stands.	
Lodgepole Terminal Weevil (<i>Pissodes terminalis</i>)	Host: Lodgepole Pine Colorado
Terminal shoot mortality was noted in Grand County, CO, in three to eight foot lodgepole pines, growing on sites that were cleared of dead lodgepole pines killed by a recent mountain pine beetle epidemic (1997-2013). Lodgepole pine terminal weevil, <i>Pissodes terminalis</i> , activity was confirmed by removal of larvae from pine leaders and then rearing adult weevils. Examination of damaged trees indicated that losses occurred in 2012 and 2013. Also, evidence of recent weevil oviposition was evident in late summer. Less than five percent of suitable trees were damaged by the lodgepole pine terminal weevil.	
Leucocyctospora Canker (<i>Valsa kunzei</i>)	Host: Blue Spruce Nebraska
Cytospora canker of spruce became more common in landscape plantings and windbreaks, probably because of additional stress in the trees caused by the continued drought. Colorado blue spruce was most commonly affected. Multiple branches and sometimes the tops of trees were killed by the disease.	

O & P: Oak Decline, Oak Wilt, Pine Wilt & pinewood Nematode, Pine Needle Scale

Oak Decline	Hosts: Black Oak, Blackjack Oak, Bur Oak, Chinkapin Oak, Northern Red Oak, Post Oak, White Oak Kansas, Nebraska
Oak Decline occurs in the eastern quarter of Kansas and in the southeastern part of Nebraska. Much of the heavily wooded areas in the north and southeastern portions of Kansas have been experiencing oak decline for the past decade. Much of this is due to an over mature canopy and environmental (especially drought) stress. Combined with these stressors, secondary pests and pathogens lead to large groups of mortality in woodlots	
Oak Wilt (<i>Ceratocystis fagacearum</i>)	Hosts: Black Oak, Blackjack Oak, Northern Red Oak, Pin Oak, Post Oak, Shingle Oak Kansas
Oak wilt is found in woodlots around the eastern portion of the state and in the outskirts of communities where native oak stands were located. The I-70 corridor tends to have isolated incidences. In our native woodlands, oak wilt tends to be patchy. Landowners and homeowners cooperative in destroying infected trees and do not keep it for firewood.	

Pinewood Nematode – (<i>Bursaphelenchus xylophilus</i>)	Hosts: Austrian Pine, Eastern White Pine, Pine Spp., Scotch Pine Kansas, Nebraska, South Dakota
<p>Pine wilt is still found in the eastern half of Kansas. Prompt enforcement of community action and cost share incentives promoted quick removal of infested pine trees in western Kansas counties. This helps prevent spread into Colorado. Pockets of older Scotch pine plantations in eastern Kansas are still creating hot spots.</p> <p>Pine wilt continued to kill thousands of Scotch and Austrian pines in eastern and south-central Nebraska in 2013. The disease occurred also in scattered locations in the central and southwestern parts of Nebraska. The Nebraska Forest Service no longer recommends using Scotch pine in long-term plantings in the state because of this pest.</p> <p>Rapidly declining Austrian and Scotch pine in the southern region of South Dakota (south of I-90) were infected by this nematode. Reports of the disease increased in 2013 with most of the affected trees occurring in the southeastern counties of South Dakota that border Nebraska. Mature Austrian pines were the species most impacted by this disease. It is the most common exotic pine planted in the South Dakota.</p>	
Pine Needle Scale (<i>Chionaspis pinifoliae</i>)	Hosts: Pine Spp. Colorado
<p>Pine needle scale has become an increasingly big issue in several areas of the Fraser Valley. Several site visits have indicated that lodgepole pines of every size from small seedlings to mature trees are heavily infested with pine needle scale. The infestation was heavy enough in some cases to kill the tree by itself. In many other cases we are seeing these trees being attacked by <i>Ips</i> or twig beetle as well. Some of these areas of infestation were 40-100 acres in size.</p>	

R & S: Round-headed Pine Beetle, Rusty Tussock Moth, & Scale Insects, Stem, Decay/Canker Disease

Roundheaded Pine Beetle (<i>Dendroctonus adjunctus</i>)	Host: Ponderosa Pine Colorado
<p>Mid- to large size ponderosa pine were being killed in an increasing area on the Dolores Ranger District in southwestern Colorado. The outbreak has been ongoing for about three years. This area is usually subject to mortality events driven by mixed broods of bark beetles (typically western pine beetle, (<i>Dendroctonus brevicomis</i>), <i>Ips</i> beetles (<i>Ips pini</i>), and roundheaded pine beetles (<i>D. adjunctus</i>)), but this particular outbreak was comprised of mortality caused by the roundheaded pine beetle. The flight period of this beetle was interrupted by some heavy precipitation events in September. Hopefully this will cause the outbreak to largely subside.</p>	
Rusty Tussock Moth (<i>Orgyia antiqua</i>)	Host: Lodgepole Pine Wyoming
<p>Pheromone trapping increased in intensity near the 2012 capture. One male moth was captured out of the 60 traps. No new defoliation was observed in 2013.</p>	

Scale Insects (Poplar scale – <i>Diaspidotus gigas</i>)	Hosts: Narrowleaf Cottonwood, Quaking Aspen Colorado
This introduced scale insect has only been found in landscape plantings of aspen in urban settings. Every inspected affected host was compromised one way or another. It is believed that these scale insects are currently attacking only stressed hosts.	
Stem Decay / Canker Disease (Known)	Host: Oneseed Juniper, Rocky Mountain Juniper Colorado
<p><i>Fomitiporia texana</i> (= <i>Phellinus texanus</i>) was previously known in the US only from Texas, Arizona, and New Mexico. This is the first report from Colorado. The fungus was very aggressive on junipers in Baca County. Trees with a single conk and causing thin crowns with 40% dieback. A tree with 8 conks had 90% dieback and was nearly dead. Dissection revealed that the fungus attacked sapwood aggressively all around the stem and especially in the lower side of branches.</p> <p>It occurred in windbreaks and riparian areas. Most likely it is widespread in the southern Plains but fruiting on a small proportion of the junipers.</p>	

T & U: Thousand Canker Disease, Twig Beetles, Unknown Abiotic Agent

Thousand Canker Disease (TCD) (<i>Geosmithia morbida</i>)	Host: Black Walnut Colorado
Fort Collins and Fort Morgan areas identified the presence of TCD in the majority of black walnuts by the summer of 2013. There was also significant loss of black walnuts in Boulder, CO. The Walnut twig borer and thousand cankers disease continued to increase in areas with a high concentration of walnut trees. However, trees in communities along the Kansas border were showing less symptoms of TCD.	
Twig Beetles (<i>Pityophthorus</i> spp.)	Hosts: Common Or Two-Needle Pinyon, Pine spp. Colorado
<p>Twig beetles were observed in El Paso and Park counties. In El Paso, they were found in the High Forest Ranch subdivision on ponderosa pine. In Park County's Warm Spring subdivision, they were identified on bristlecone pine.</p> <p>Secondary beetle activity such as <i>Ips</i> and twig beetles was widely scattered. In 2013, several new areas of infestation were identified. It is expected that these will remain active for a season or two and then fade away. Inspections of past areas of outbreak show that to be a common pattern. As mentioned above, we are commonly seeing areas of elevated twig beetles associated with pine needle scale.</p> <p>Piñon twig beetle is on the increase in landscape trees in Otero County. Piñon twig beetle (<i>Pityophthorus</i> spp.) was commonly observed by arborists in the Durango area and other parts of La Plata County. This was probably due to moisture stress from the low snowpack and a dry spring/early summer.</p>	

Unknown Abiotic Damage	Host: Ponderosa Pine Colorado
<p>The following needle malady was scattered throughout ponderosa pine in the foothills of the southern Front Range west of I-25 from Pueblo to Trinidad, Colorado: the more common damage observed did not affect current-year needles, but older needles of all ages were generally affected. Damaged needles were straw-colored or orange (hereafter simply referred to as “discolored”) and scattered evenly throughout the crowns, not noticeably concentrated at the top or bottom. Usually symptomatic trees were scattered among healthy trees, but clumping of symptomatic trees was occasionally observed.</p> <p>Discrete banding on needles was fairly consistent with this damage. However, bands were highly variable and often this variability could be seen in a single tree. Bands frequently were dark red, sometimes with orange, pink, or yellow borders, with white exuded resin on the band. Sometimes bands were green on a yellowish or orange background. Rarely, we saw the rainbow-like bands, with a sequence of red, yellow, orange and green colors. If bands were very abundant, with several bands on each needle, some of the bands appeared to have faded.</p> <p>Aside from the bands, there was typically a portion of the needle that was discolored. Most often, a band occurred somewhere along the needle, and the rest of the needle distal to the band was discolored while the proximal portion remained green. However, there were many variations. Some needles were discolored in the middle with green at the base and tips; other were discolored at the base with a green tip, and still others speckled green and orange. Fungal fruiting was not found on any needles. There are many endophytic fungi in pine needles, but they are poorly known. They may have developed as the needles senesced and caused the banding.</p> <p>This location was in severe drought for the last several years. Years of drought and heat stress can lead to foliar browning in conifers (Sinclair 2005). Further stress can lead to dieback. Dying of leaves and twigs in spring, often associated with warm, dry, windy weather in late winter and early spring, is a condition sometimes called “parch blight”. When it occurs on a distinct elevational stratum, it is more often called “red belt injury”.</p> <p>Polygons identified by aerial survey were mostly the foliage damage described here, but some were caused by other agents. In a few polygon, we found severe, extensive infestations of southwestern dwarf mistletoe that likely contributed to the crown symptoms that were mapped. In at least one polygon, in and near Rye Mountain Park, all the damage that we found was along a fairly dense network of roads and appeared to be due to MgCl₂. The aspen and white fir along the roads also showed symptoms, except for a few cases of twig beetle away from the roads. We also found twig beetles in or near other polygons when trying to diagnose damage. Needleminer and sawfly damage were also seen occasionally, but they caused slight damages.</p>	

W & Z: Weather Damages – Drought, Frost, Western Cedar Bark Beetles, Western Pine Beetle, Western Tent Caterpillar, & Zimmerman Pine Moth

Weather Damages - Drought	Host(s): Austrian Pine, Blue Spruce, Eastern Redcedar, Eastern White Pine, Hickory Spp., Norway Spruce, Ponderosa Pine, Scotch Pine Kansas, Nebraska
<p>Western Kansas had exceptional drought. The latest Drought Monitor indicates that conditions are expected to continue through the winter into 2014. Although spring and early summer rains came in the east, drought stress continued in many parts of the state. Planted pines, eastern red cedars, hickory, oaks, silver maples, sycamores, elms, ash, and black walnut trees were hit especially hard this year.</p> <p>Drought conditions continued in Nebraska in 2013 with abnormally dry conditions or worse in more than 86% of the state during the entire year. Severe drought conditions existed in more than 26% of the state during the year. Drought can cause significant tree losses in communities and rural areas as it kills trees outright when soil becomes too dry and when it makes trees more susceptible to serious disease and insect pests because of additional stress.</p> <p>In 2013, drought conditions alone or as the primary agent killed hundreds of trees including ponderosa, eastern white, Austrian, and Scotch pines; Norway and Colorado blue spruces; and eastern red cedars were also extremely damaged.</p> <p>The latest Drought Monitor indicates general improvements in eastern areas, with moderate drought or worse of 96 percent for the western areas.</p>	
Weather Damages - Frost	Host(s): Ponderosa Pine Colorado
<p>In Montezuma County on the San Juan National Forest, damaged trees had patches of orange/straw color either scattered throughout the entire crown or concentrated in the upper crown. Shoot tips were killed and dead needles were a uniform straw color. Based on their condition, all such shoots appeared to have been killed at the same time. Severity varied from killing just a few shoots to nearly all shoot tips damaged. The most severely damaged trees are unlikely to survive.</p> <p>In damaged shoots, current-year shoots and needles were always completely killed. However, part or all of 1-4 prior years were killed. Patchy bark necrosis in older growth was associated with patchy death of needles in that complement.</p> <p>Killed shoot bark was brown and somewhat dry, especially current-year growth. Killed wood was slightly off-color and sound. Some trees seem to have had similar damage in prior years and have ongoing twig and branch dieback as a result.</p> <p>The current episode of damage affected more trees than it did in prior years. Needles fell out during the season and damage became much less noticeable. The pine needles seem to have been almost expanded when they were killed, but some were still just emerging from the fascicles. Killed buds were in the open “fuzzy” stage of growth, not smooth and hard as</p>	

they get for dormancy.

These facts indicate that the killing occurred after most needles had emerged and shoot growth was well underway. There was abundant and obvious frost damage in the Gambel oak, and leaves were ½ to fully expanded when they were killed. Also, almost all roundleaf snowberry flowers had been killed during development; the dead flowers were still attached and there was very little snowberry fruit. We did not see evidence of frost damage on aspen or chokecherry.

This is pretty clearly frost damage. Late frost damage was seen in two other species. The damage in pine all occurred at about the same time and was sudden.

Small trees up to about 12" DBH had the most severe damage, but it also occurred to a lesser extent in some of the large trees (over 24" DBH). The smaller trees appeared to have been planted: the ground appeared to have been shaped into terraces and in some cases we could see that the trees were in rough rows on the terraces. Also, the smaller trees all looked to be of the same age.

There were light infestations of scale insects around bud scars of some shoots, but because this was not present consistently on affected shoots, we concluded that it was unrelated to the sudden twig death. We found no fungal fruiting, including on cones.

Western Cedar Bark Beetle (*Phloeosinus punctatus*)

Host: Eastern Redcedar, Rocky Mountain Juniper **South Dakota**

Cedar bark beetles (*Phloeosinus* spp.) are secondary insects that hasten the decline of junipers that are already stressed. The predisposing stress for this outbreak was the 2011-2012 drought. The combination of the drought and colonization by this insect has resulted in the loss of juniper (cedar) windbreaks in the southcentral part of the state.

Western Pine Beetle (*Dendroctonus brevicornis*)

Hosts: Pine species **Colorado**

No significant western pine beetle was detected in 2013 in southwestern Colorado. A suspected infestation was ground checked and verified to be roundheaded pine beetle.

Western Tent Caterpillar (*Malacosoma californicum*)

Host: Quaking Aspen **Colorado**

There were substantial increases in both area of impact and severity within previously defoliated stands in southern Colorado. Due to several consecutive years of defoliation, some level of aspen tree mortality is likely in the most heavily impacted stands. Increased evidence of wood borers was noted in association with several heavily defoliated stands south of Pagosa Springs, CO. Outbreaks affected trees in the mountains and ornamental trees in the valleys of southern Colorado, especially aspen, chokecherry and cottonwood.

Western tent caterpillar was especially active in aspen in higher elevations of Archuleta and Hinsdale Counties, with heavy early defoliation often followed by re-leafing later in the

summer. Some areas were devoid of autumn colors due to the absence of leaves on the aspen. Western tent caterpillar damaged aspens in small isolated pockets throughout Boulder and Gilpin Counties.

Zimmerman Pine Moth (<i>Dioryctria zimmermani</i>)	Host(s): Austrian Pine, Ponderosa Pine, Scotch Pine Nebraska, South Dakota
<p>Three species of <i>Dioryctria</i> (Zimmerman) pine moth continued to cause branch and tree mortality in Nebraska. Symptoms include masses of pitch (resin) that form on the bark where the insects are inside tunneling. The insects are present in western and central Nebraska, as well as in the Lincoln and Omaha areas. Ponderosa, Austrian and Scotch pines are commonly attacked, and young trees generally sustain more damage than mature trees.</p> <p>Zimmerman pine moth continues to be a problem in windbreaks and ornamental plantings across South Dakota. Austrian pine is the primary species affected, though ponderosa pine windbreaks are also experiencing significant branch injury.</p>	

Appendices Part I and Part II (see attached documents)

To maintain report Accessibility Compliance and the unique formatting issues of these reports, parts were added to the “**2013 Forest insect and Disease Conditions in the Rocky Mountain Region (R2)**” as the following appendices.

Appendices Part I were reports of Aerial Survey Highlights and Press Releases produced in February 2014 for Colorado, South Dakota, and Wyoming. These documents were produced in preparation for state legislature presentations. 18 pp.

Table of Contents for Appendices Part I: a compilation of Appendices A - F

	Pages
Appendix A:: Colorado Highlights from the Aerial Detection Survey	2
Appendix B: Colorado Press Release	7
Appendix C: South Dakota Highlights from the Black Hills Aerial Photography Interpretation	9
Appendix D: Black Hills Press Release	10
Appendix E: Wyoming Highlights from the Aerial Detection Survey	12
Appendix F: Wyoming Press Release	17

Appendix II was The 2013 Aerial Detection Survey Summary for the Rocky Mountain Region (R2) of the US Forest Service. This report contains summary tables prepared in November 2013 for data analyses and use for future condition reports. 31 pp.

For complete Accessibility, please contact : R2 Forest Health Monitoring; USDA Forest Service. (jerilyn.harris@fs.fed.us 303-275-5155).

Appendix A: Colorado Aerial Survey Highlights

Mountain Pine Beetle

- Mountain pine beetle has affected 3.4 million acres in Colorado since 1996.
- The epidemic has slowed down in many areas of Colorado (Figure 1) as mature pine trees have been depleted in the core outbreak areas (Figure 2). The epidemic has also slowed down along the southern and western fronts despite availability of susceptible host trees (Figure 3).
- The mountain pine beetle affected area in Colorado expanded by 8,000 acres compared to an increase of 31,000 acres in 2012.
- In Colorado, mountain pine beetle was active on 97,000 acres in 2013 and 32,000 of that was in ponderosa pine. Mountain pine beetle activity occurred primarily in the northern Front Range counties of Larimer with 85,000 acres and Boulder with 1,600 acres. Notable damage on the western slope was detected on 3,700 acres in Eagle County.

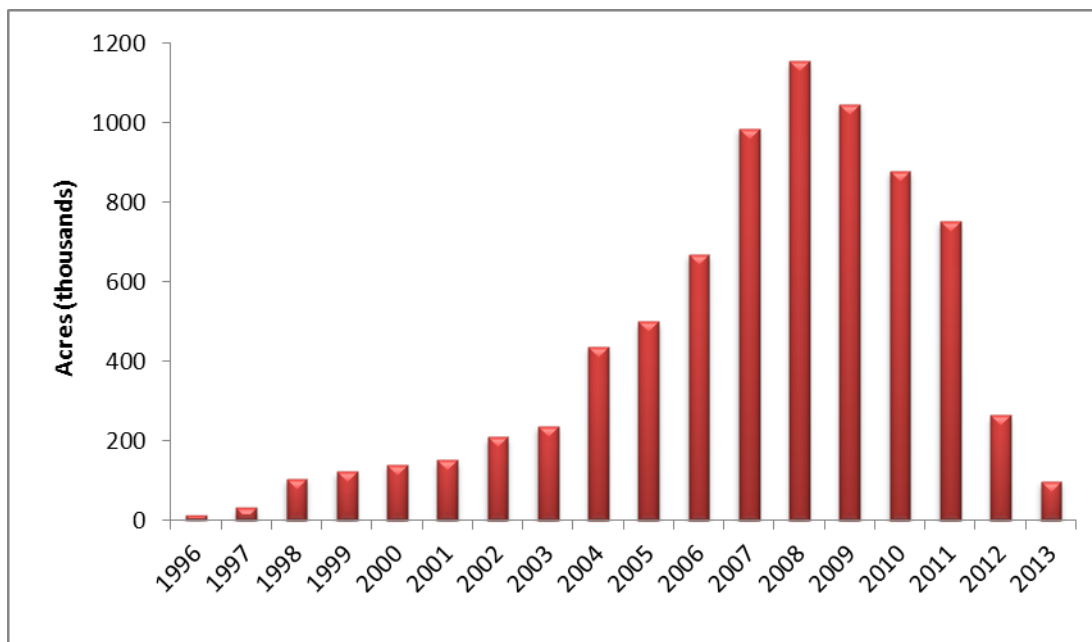


Figure 1. Annual acres affected by mountain pine beetle in Colorado.



Figure 2. Forest Picture of Grey overstory in lodgepole stand typical of areas heavily impacted by MPB activity. Note relatively minor impacts in regenerating clearcuts. Arapaho N.F. east of Branch Reservoir, CO. 2013. Photo: Justin Backsen.

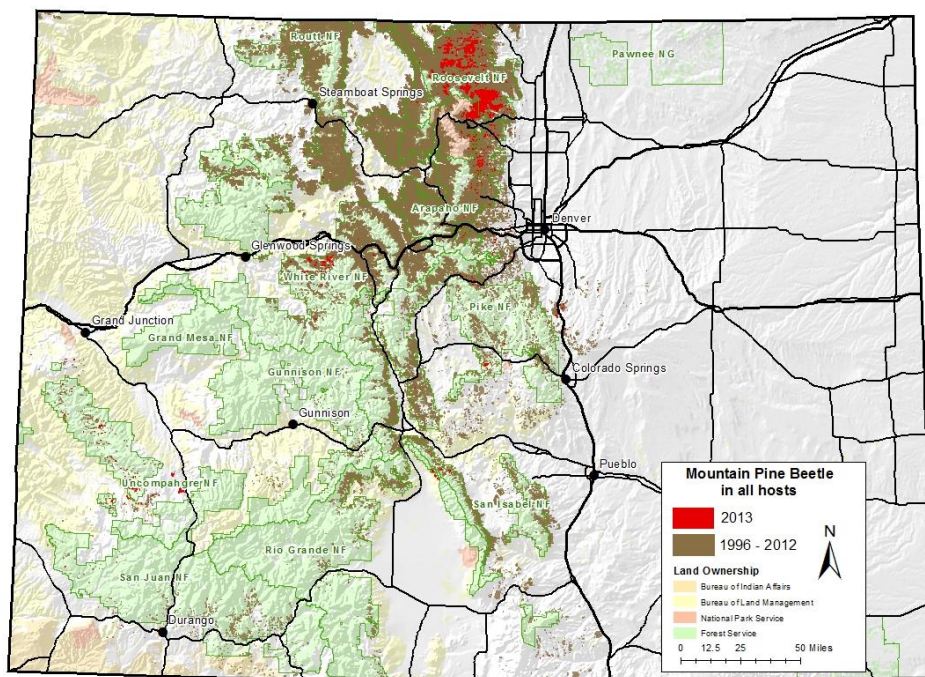


Figure 3. Map of Mountain pine beetle activity in Colorado 1996-2013.

Spruce Beetle

- Since 1996, spruce beetle has affected 1,144,000 acres in Colorado.
- Spruce beetle activity was detected on 398,000 acres in Colorado in 2013. Of these 216,000 acres are in areas not previously mapped as having spruce beetle activity (new acres). This increase in activity is indicative of a rapidly expanding outbreak (Figure 3). In some areas, the outbreak has moved through entire drainages in the course of one year. In the most heavily impacted drainages, nearly every mature spruce has been killed from the creek bottoms all the way up to the high elevation krummholz.
- In southern Colorado's Forests, the spruce beetle epidemic continued to expand, impacting many thousands of acres. Included to-date are areas in proximity to the Continental Divide from the La Garita Wilderness Area north to Monarch Pass (and likely beyond) and portions of the Sangre de Cristo and Wet Mountains, as well as the Cuchara area south of LaVeta, CO. Aerial survey in south central Colorado showed spruce beetle epidemics expanded on the San Juan (53,000 new acres out of 75,000 active acres), Rio Grande (98,000 new out of 205,000 active acres), Grand Mesa (3,000 new acres out of 13,000 active acres), Gunnison (20,000 new acres out of 34,000 active acres), and San Isabel (7,200 new acres out of 8,600 active acres) National Forests. Activity continues on the White River (3,300 active acres).
- In northern Colorado spruce beetle caused new tree mortality along the Medicine Bow and Rabbit Ears Mountains and is active on 40,000 acres in Grand, Jackson, and Larimer Counties. Much of this activity is found from Cameron pass to Willow Creek pass and west along the Rabbit Ears Range
- A substantial amount of windthrow occurred in the fall and winter of 2011 and 2012 in central Colorado in spruce-fir and mixed conifer stands in areas where we have not been observing spruce beetle in recent years (Figure 5). The 2012 ADS flights documented 117 aerially detectable blowdown polygons on a total of 4,100 acres in Colorado, additional areas of blowdown have been observed on the ground. This is cause for concern as wind thrown spruce provides prime breeding habitat for spruce beetles and populations built up in downed timber can move into adjacent standing trees. In 2013, ground crews observed spruce beetles breeding in wind thrown spruce in previously unaffected areas.

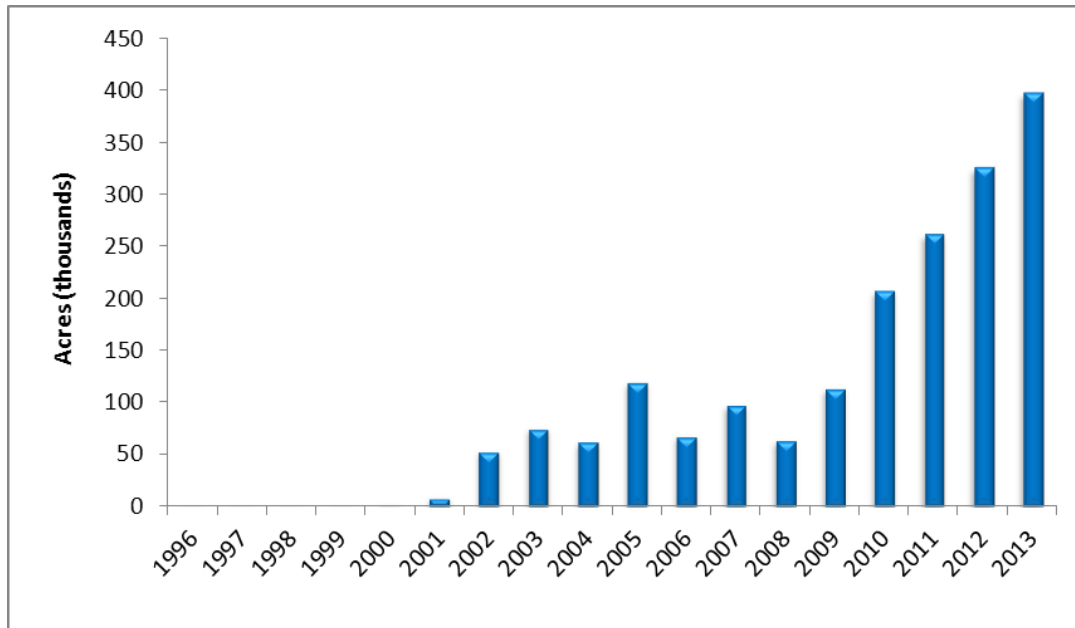


Figure 4. Chart indicating increasing annual acres affected by spruce beetle in Colorado from 2001 to 2013.

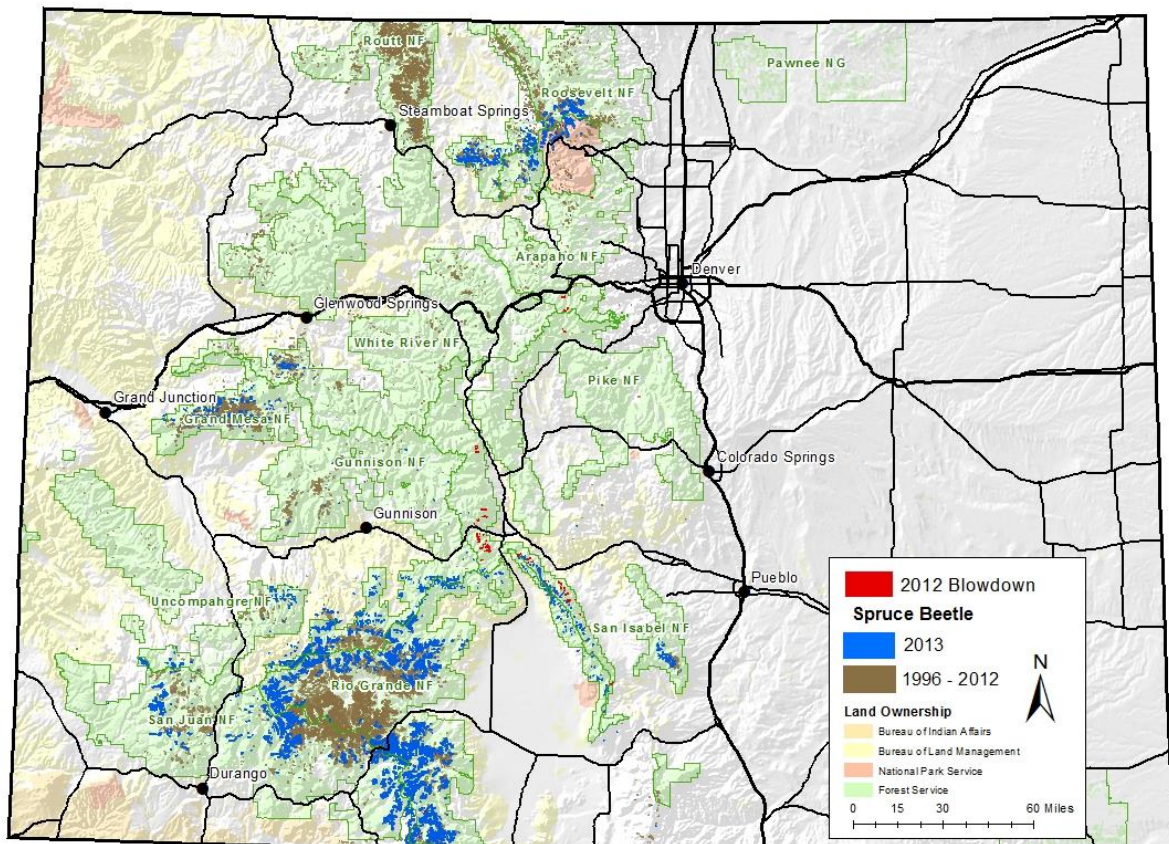


Figure 5. Map showing Spruce Beetle activity in Colorado 1996-2012 and blowdown observed in the 2012 survey.

Douglas-fir beetle

- Douglas-fir beetle activity was detected on 43,000 acres and expanded onto 33,000 previously unaffected acres in CO. Scorched Douglas-fir trees in areas burned the last two summers can attract Douglas-fir beetles and lead to future outbreaks in adjacent forest stands. Levels of Douglas-fir tree mortality vary widely from scattered mortality in some stands to almost the total loss of mature Douglas-fir in others.

Western balsam bark beetle

- Western balsam bark beetle activity was detected on 178,000 acres in subalpine firs across Colorado. These infestations were generally widespread but kill fewer trees per acre than other bark beetles currently active in the state. This tree mortality is often associated with root disease in these high elevation forests.

Pinyon engraver/ twig beetle

- Damage/ mortality detected during in aerial survey to pinyon pine increases from approximately 1,900 acres in 2012 to just over 15,000 acres in 2013.

Fir Engraver:

- Acres affected of fir engraver on white fir increases from approximately 4,700 acres in 2012 to 37,000 acres in 2013.

Western spruce budworm

- **Western spruce budworm** activity decreased in Colorado in 2013. Aerial surveys detected 156,000 acres affected in the state in 2013 compared to 217,000 acres in 2012. This insect is a defoliator that feeds on the new needles of white fir, Douglas-fir and less notably on spruce and subalpine fir. Activity was found mainly on the San Isabel, San Juan, and Rio Grande National Forests.

Appendix B: Colorado Press Release

Aerial Survey Shows Mountain Pine Beetle Epidemic Declining, Spruce Beetle Numbers Escalating

Release Date: Jan 30, 2014 Golden, CO

Contact(s): Chris Strebbig, 303-275-5346 (USFS), Ryan Lockwood, 970-491-8970 (CSFS)

GOLDEN, Colo., Jan. 30, 2014, –The US Forest Service and Colorado State Forest Service (CSFS) today released the results of the annual aerial forest health survey in Colorado, which indicate that the spread of the mountain pine beetle epidemic has slowed dramatically, while the spruce beetle outbreak continues to expand. Each summer the agencies work together to aurally monitor insect and disease-caused tree mortality or damage across Colorado forestland.

The mountain pine beetle epidemic slowed again in 2013, with the lowest acreage of active infestation observed in 15 years. Statewide, mountain pine beetle was active on 97,000 acres in 2013. This brings the total infestation to 3.4 million acres in Colorado since the first signs of the outbreak in 1996.

The spruce beetle outbreak was active on 398,000 acres across the state, expanding by 216,000 new acres in 2013, compared to 183,000 new acres in 2012. The total area affected by this beetle since 1996 has reached more than 1.1 million acres.

Conversely, aspen forest conditions in the state have continued to improve. The aerial survey indicates that although there is continued mortality following drought in the early 2000s, the decline has slowed, with only 1,200 acres impacted in 2013.

“Through our collaborative efforts we are improving the health of our public lands. Our continuing work on the land, together with other agencies, partners and the wood products industry will allow for the treatment of more acres in need of restoration at an increased pace,” said Dan Jirón, Regional Forester for the Rocky Mountain Region of the US Forest Service.

“Restoring forest health and resiliency is a top regional priority, and is guiding much of the work on the forests. In 2013, these National Forest projects in this Region led to enough timber harvested to construct 25,000 homes.”

“Bark beetles and other forest health concerns don’t recognize property boundaries, so it’s critical for land managers and private landowners to work together to address forest management across federal, state and private lands,” said Mike Lester, State Forester and Director of the CSFS. “The Colorado State Forest Service provides private landowners, who are the stewards of most non-federal lands in Colorado, the tools they need to improve forest health and achieve their management objectives.”

The US Forest Service is taking action to address the bark beetle infestations. The Rocky Mountain Region is focused on increasing the pace and scale of active forest management across Colorado. Each National Forest is stepping up forest treatments, and many are working collaboratively to strategically plan and apply work to the areas that need it most. The US Forest Service now has four 10-year stewardship contracts to remove dead trees to restore forests and increase their resiliency. The US Forest Service has also awarded several short-term stewardship contracts aimed at improving forest health and adding to local economies.

One example is the recently operational Gypsum biomass plant. The plant converts wood chips from beetle-killed trees into enough electricity to run the plant and pump an additional 10 megawatts into the Holy Cross Energy Facility, which powers approximately 55,000 customers in Eagle, Pitkin, Garfield, Gunnison and Mesa counties. Much of the wood the plant will process will come from beetle-killed trees from the White River National Forest.

Forestry agencies have a key role in sustaining forest ecosystems, which provide many benefits to the people of Colorado and many surrounding states. Whether progress is measured by the reduction of large-scale wildfires, timber harvested or number of forest acres treated; the outcome is the same: healthy and resilient forests, and the protection of forested watersheds.

While the US Forest Service takes action on National Forest lands, the CSFS works with private landowners to help them meet their management objectives to achieve healthy forests. The agency will release a new quick guide on the spruce beetle by April, and in 2013 held educational public meetings about the beetle for citizens in Chaffee, Custer, Fremont, Huerfano, Lake, Las Animas, Pueblo and Saguache counties.

For further information on forest health conditions in the Rocky Mountain Region, visit <http://www.fs.usda.gov/main/r2/forest-grasslandhealth>

For information directed at private landowners to help manage for healthier forests, visit www.csfs.colostate.edu.

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The mission of the U.S. Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The agency manages 193 million acres of public land, provides assistance to state and private landowners, and maintains the largest forestry research organization in the world. Public lands the Forest Service manages contribute more than \$13 billion to the economy each year through visitor spending alone. Those same lands provide 20 percent of the nation's clean water supply, a value estimated at \$27 billion per year. The agency has either a direct or indirect role in stewardship of about 80 percent of the 850 million forested acres within the U.S., of which 100 million acres are urban forests where most Americans live.

The Colorado State Forest Service is the lead state agency for providing forest stewardship and management, fuels reduction and wildfire mitigation assistance to private landowners in Colorado. Every year, the CSFS helps treat 20,000 acres of forestland, and assists approximately 6,400 landowners and hundreds of communities to help improve forest health. The CSFS is a service and outreach agency of the Warner College of Natural Resources at Colorado State University.

Appendix C: South Dakota Highlights from the Black Hills Aerial Photography Interpretation

Mountain Pine Beetle has affected 414,000 acres in South Dakota since 1996. In the same time period, 430,000 acres have been affected on the entire Black Hills National Forest, which extends into Wyoming (Figure 1).

Since 2012 the numbers reported for the insect and disease survey in South Dakota have been produced from aerial photo interpretation rather than by sketchmappers in aircraft as is done in the rest of the region. In 2013, high resolution Aerial photographs were taken by aircraft flying over the Black Hills on clear days in mid- August through September.

Photographs were analyzed and 14,000 previously unmapped new acres were mapped in 2013 in compared to 11,000 new acres mapped in 2012 in South Dakota. Mountain pine beetle was active on 33,000 acres.

Mountain pine beetle populations are slowly starting to decline in much of South Dakota and this is demonstrated by the low rate of increase in new infested acreage this year. Ground surveys showed a mostly static mountain pine beetle population in much of the Black Hills National Forest, however there are some areas still experiencing epidemic expansion levels. The new acres continue to occur in and around large areas of already highly infested ponderosa pine stands.

Areas in South Dakota that continue to be at high risk for mountain pine beetle expansion are the west central part of the Hills near the South Dakota/Wyoming state line, the northwest corner of the Hills and southeast of Custer.

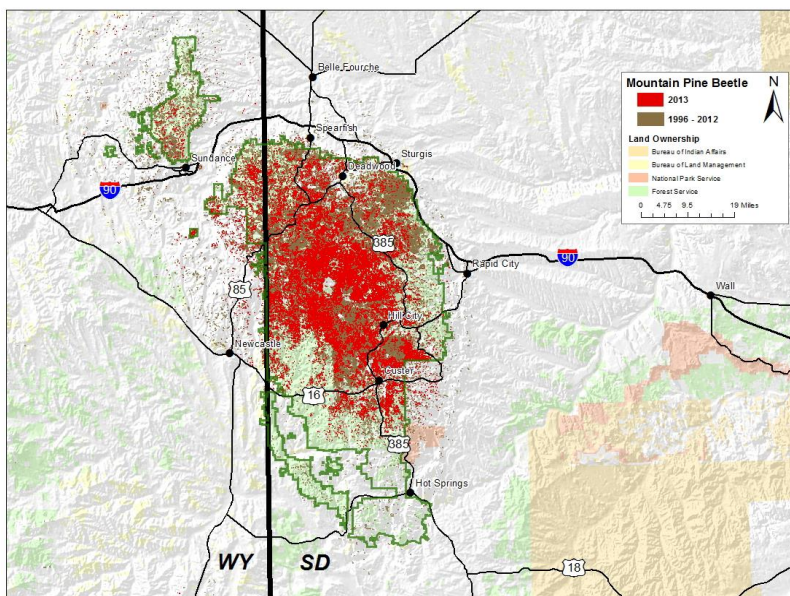


Figure 1. Map showing mountain pine beetle activity on the Black Hills National Forest 1996-2013.

Appendix D: Black Hills Press Release

2013 Forest Health Survey Released

Release Date: Feb 12, 2014

Contact(s): Scott Jacobson (605) 673-9216

The U.S. Forest Service, South Dakota Department of Agriculture (SDDA) and Wyoming State Forestry Division today released the results of the annual aerial forest health survey on the Black Hills National Forest. The aerial photography detection indicates that the rate of spread of the Mountain Pine Beetle has slowed due to a lower increase in newly affected acreage this year.

The Mountain Pine Beetle has affected approximately 430,000 acres since the outbreak began in 1996. In 2013 analysts detected 34,000 affected acres of mountain pine beetle trees. This compares to 31,000 acres in 2012. The mountain pine beetle epidemic continues, however the rate of expansion is slowing.

“We see encouraging declines in some areas but we need to stay vigilant with this epidemic. We need to keep working with our partners to keep our forests green and more resilient to insects and damaging wildfire,” said Craig Bobzien, Forest Supervisor. Numerous agencies, forest products industry, private land owners and conservation leaders are implementing an “all lands” strategy to slow the spread of the mountain pine beetle. “We are most effective when we work together across large landscapes, and ahead of the beetle infestations. We’re making a difference,” said Bobzien.

A variety of methods have been used to treat hundreds of thousands of trees including forest thinning, cut and chunk, prescribed fire and chemical spraying.

SDDA, Division of Resource Conservation and Forestry leaders have effectively reduced the spread of the beetle in Custer State Park and have worked closely with private landowners throughout the forest. “While the U.S. Forest Service takes action on National Forest lands, the SDDA works with private landowners to help them meet their management objectives to achieve healthy forests,” said Ray Sowers, South Dakota State Forester.

Over the last three years, the state of Wyoming has invested approximately \$4 million in mountain pine beetle detection, prevention and direct control in Crook and Weston Counties. “I believe that we are seeing positive results on the ground from the efforts being put forth, and think that the coalition of local, state, and federal agencies, along with industry and other interested groups, is a model that we should replicate to promote forest management across the region,” said Bill Crapser, Wyoming State Forester.

Dave Thom, Black Hills Regional Mountain Pine Beetle Working Group Coordinator says, “In the last two years partners have treated infested or high risk trees on over 350,000 acres. The work is making a difference. The beetles don’t know boundaries and it takes all of us working together

to slow this epidemic.” The working group represents a comprehensive, all lands approach where Federal, State and County agencies are working with industry and private landowners to ensure treatments are at the right place at the right time. He added, “We are focusing our work in locations where the epidemic continues to be most active.”

Thom also credits Federal and State Legislators, to include Governors from both South Dakota and Wyoming for their support in providing funds for the effort.

The complete survey results for the Rocky Mountain Region, including Colorado, Nebraska, South Dakota and Wyoming is available at <http://www.fs.usda.gov/main/r2/forest-grasslandhealth>.

Insect mapping was a cooperative effort between Neiman Timber Company, South Dakota Division of Resource Conservation and Forestry, State of Wyoming Forestry Division, Weston Natural Resource Conservation District, Weston County Weed & Pest, USDI-Bureau of Land Management, and the USDA-Forest Service

Additional information on Mountain Pine Beetles can be found at:
<http://www.beatthebeetles.com/>.

Appendix E: Wyoming Aerial Survey Highlights

Mountain Pine beetle

The mountain pine beetle epidemic has declined across Wyoming in 2013 with the exception of the Black Hills in the NE corner of the state. Statewide, the number of acres affected has declined from 180,000 in 2012 to 82,000 in 2013 (Figure 1). Since 1996, the total number of affected acres is over 3.4 million.

Mountain Pine Beetle

- **South central Wyoming** (Medicine Bow National Forest and adjacent lands in Carbon, Albany, Converse, Natrona, Laramie and Platte counties) - This area has seen a decline of mountain pine beetle activity from 49,000 acres in 2012 to 4,800 in 2013 largely due to susceptible host depletion.
- **Western Wyoming** (Shoshone, Wasatch-Cache and Bridger Teton National Forests and adjacent lands in Lincoln, Sublette, Uinta, Freemont, Park and Teton counties) - Mountain pine beetle activity has declined from 122,000 acres in 2012 to 75,000 in 2013 in lodgepole and 5-needle pines largely due to susceptible host depletion.
- **North central Wyoming** (Bighorn National Forest and adjacent lands in Bighorn, Johnson, Sheridan and Washakie counties) - Large areas of forest remain unaffected by mountain pine beetle in this area. In 2013, 590 acres of mountain pine beetle activity was detected.
- **North east Wyoming-** (Black Hills National Forest and adjacent lands in Crook and Weston counties) Mountain pine beetle activity continues, and may be increasing locally. Aerial photograph interpretation detected 760 acres of mountain pine beetle activity in this area (Figure 2).

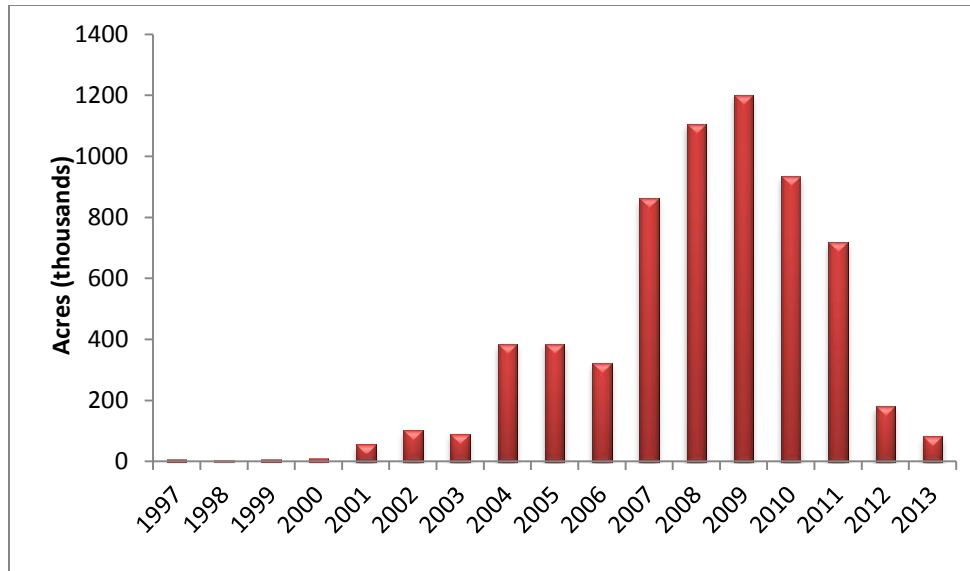


Figure 1. Chart indicating increasing annual acres affected by mountain pine beetle in Wyoming from 2001 – 2009, and then decreasing to 2013.

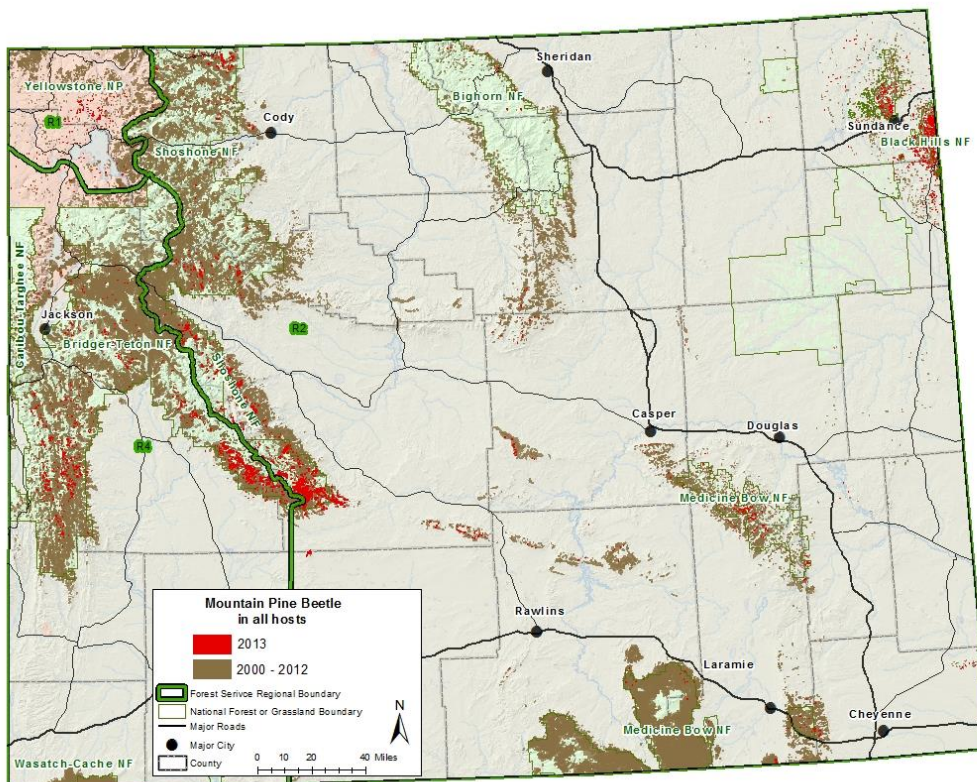


Figure 2. Map showing mountain pine beetle activity in Wyoming 2000-2013

Spruce Beetle

Spruce beetle activity has remained relatively constant at 36,000 acres in 2013 after dropping from 76,000 in 2011 to 32,000 acres in 2012 statewide (Figure 3). Since 1996, 558,000 acres have been affected by spruce beetle statewide leaving many areas of large dead standing spruce in higher elevations.

In south central Wyoming, spruce beetle populations are declining leaving large areas of dead standing, large spruce in the Sierra Madre, Snowy Range, and Medicine Bow Mountains in Albany and Carbon Counties.

In northwestern Wyoming's Absaroka Mountains in and adjacent to the Shoshone National Forest, spruce beetle continues to kill spruce and many areas have few surviving mature spruce remaining. Spruce beetle activity is more localized and slightly increasing in portions of the Wind River Range.

In north central Wyoming spruce beetle caused tree mortality continues to be confined in localized areas in the northern Big Horn Mountains in Big Horn and Sheridan Counties (Figure 4).

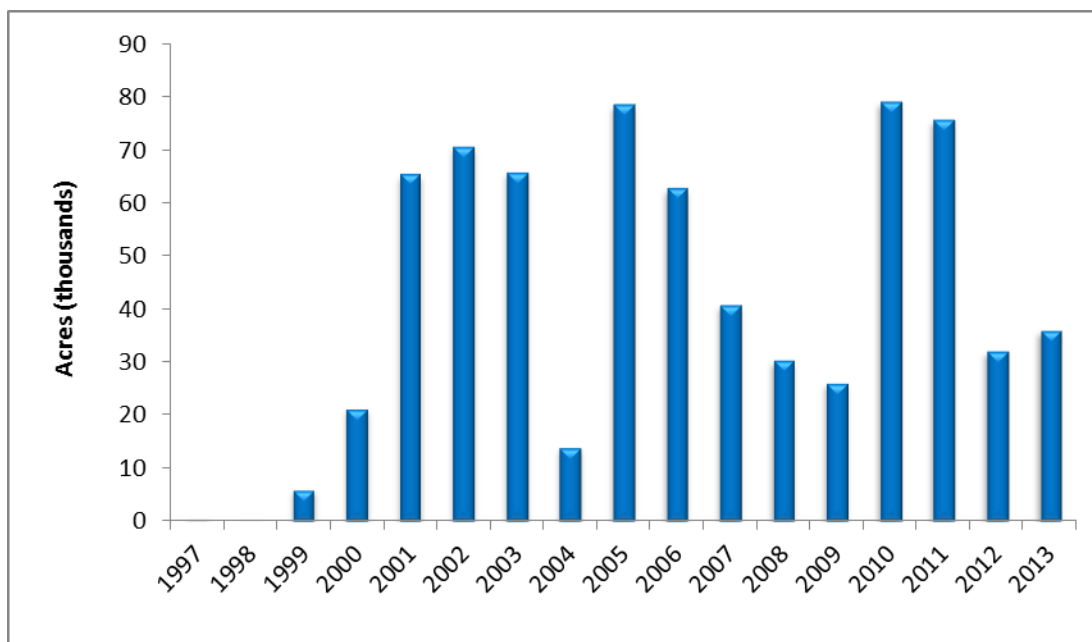


Figure 3. Chart indicating annual acres affected by spruce beetle in Wyoming, 1999 - 2013.

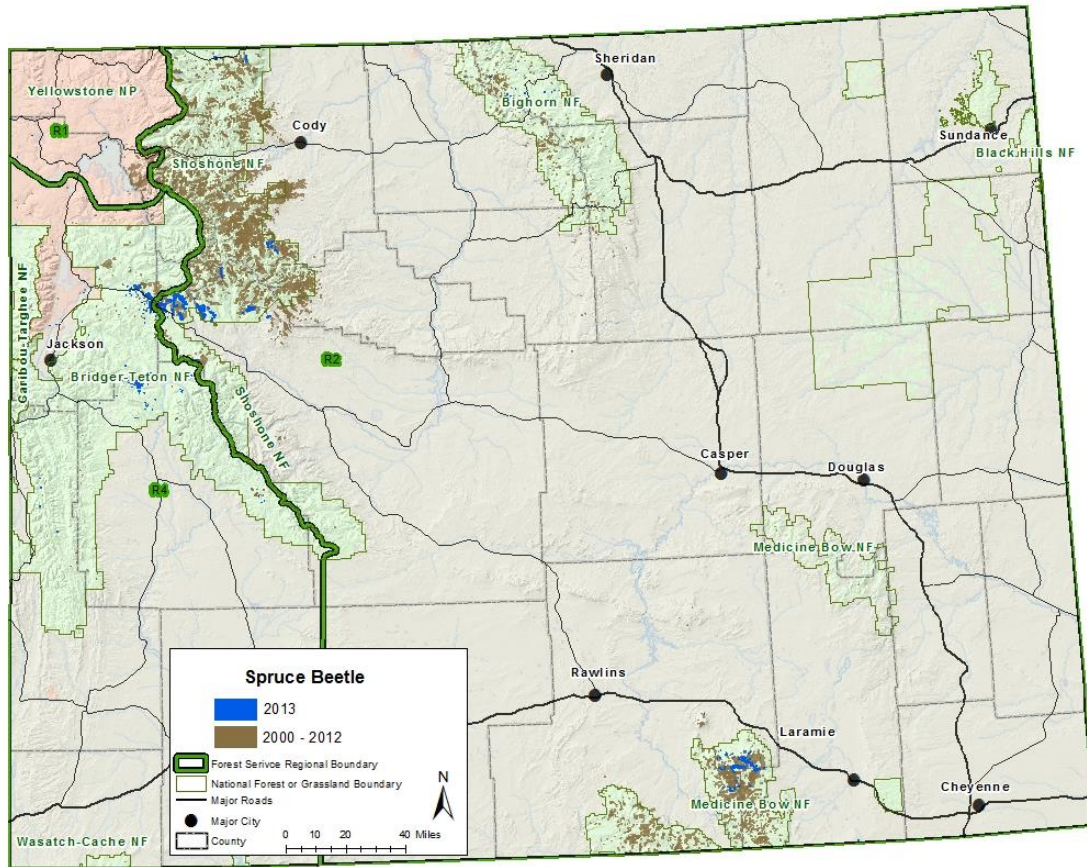


Figure 4. Map showing spruce beetle activity in Wyoming 2000-2013.

Douglas-fir Beetle

Tree mortality from Douglas-fir beetle was detected on over 400,000 acres primarily during the early and mid-2000's but it has remained at low levels for several years with only 1000 acres affected in 2013 (Figure 5). The largest area affected this year was 620 acres in southern Sweetwater County in the Tepee and Little Mountain area just north of the Colorado border.

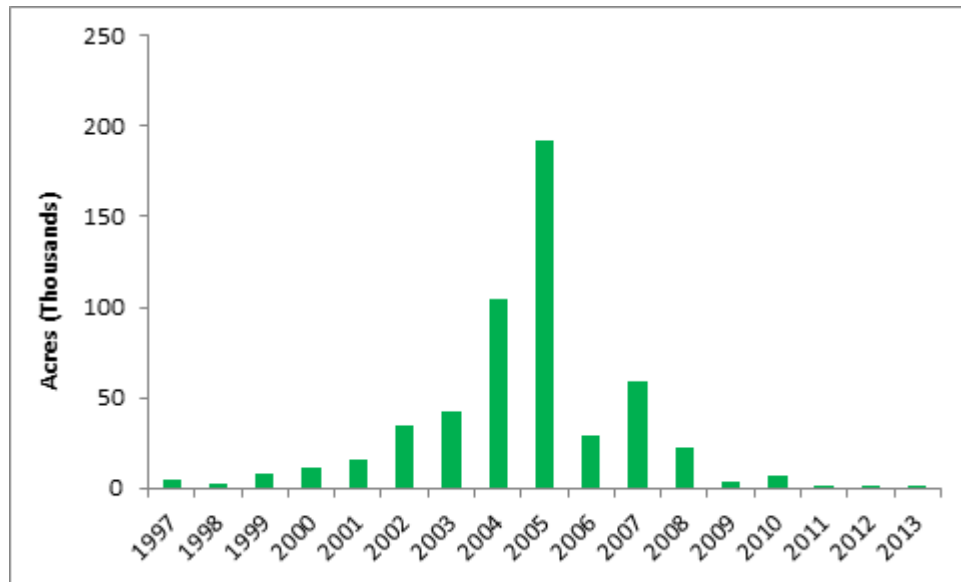


Figure 5. . Chart indicating annual acres affected by Douglas-fir beetle in Wyoming, 1997 2013.

Appendix F: Wyoming Press Release

Aerial Survey Shows Mountain Pine Beetle Epidemic Declining in most of Wyoming

Release Date: Feb 13, 2014 740 Simms St, Golden, CO 80401

Contact(s): Chris Strebig, office 303-275-5346, cell 303-681-1773

DENVER – The U.S. Forest Service and Wyoming State Forestry Division today released the results of the annual aerial forest health survey in Wyoming, which indicates that the spread of the mountain pine beetle epidemic has slowed dramatically, while the spruce beetle outbreak continues at low levels. Each summer the agencies work together to aerially monitor insect and disease caused tree mortality or damage across Wyoming forestland.

As noted in the 2012 survey results, the mountain pine beetle epidemic continues to slow in 2013. Mountain pine beetle was active on 82,000 acres in 2013. Statewide, the epidemic expanded onto only 29,000 previously unaffected acres primarily in the southern Wind River Range on high elevation 5-needle and lodgepole pines. Mountain pine beetle activity is being actively suppressed by forest management in the western Black Hills in Crook and Weston County where less than 1,000 newly affected acres were detected. More than 3.4 million acres in Wyoming have been affected statewide since the first signs of the outbreak in 1996.

Spruce beetle was active on 36,000 acres across the state, expanding by 19,000 new acres in 2013, compared to 17,000 new acres in 2012. Most of the 2013 spruce beetle caused tree mortality occurred in the western part of the state. The total area affected by this beetle since 1996 has reached 577,000 acres.

Douglas-fir beetle remains at low levels in Wyoming with only 1,000 acres affected in 2013 of which 620 acres were reported from southern Sweetwater County.

“Through our collaborative efforts we are improving the health of forests across Wyoming. Together with other agencies, partners and the wood products industry, we continue our work to accelerate the treatment of forests impacted by this long-term event,” said Dan Jirón, Regional Forester for the Rocky Mountain Region of the Forest Service. “Restoring forest health and resiliency is a top regional priority, and is guiding the work on forests. In 2013, these projects resulted in enough timber harvested from National Forests across the region to construct 25,000 homes.”

The Forest Service is taking action to address the bark beetle infestations. The Rocky Mountain Region is focused on increasing the pace and scale of active forest management across Wyoming. Each National Forest is stepping up forest treatments, and is working collaboratively to strategically plan and apply work to the areas that need it most. The Forest Service now has four 10-year stewardship contracts across the region to remove dead trees to restore forests and increase their resiliency. Additionally, the Forest Service has awarded several short-term stewardship contracts aimed at improving forest health and adding to local economies.

According to Bill Crapser Wyoming State Forester, "While I am extremely pleased that the rate of spread of all types of bark beetle has slowed, we need to remember that over 4 million acres of our forests in the state have been impacted by beetles over the last 15 years. We need to focus on what we want these lands to look like 100 years from now, and actively manage in that direction."

For further information on forest health conditions in the Rocky Mountain Region, visit <http://www.fs.usda.gov/main/r2/forest-grasslandhealth>. For information directed at private landowners to help manage for healthier forests, visit <http://wsfd.wyo.gov/>

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The mission of the U.S. Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The agency manages 193 million acres of public land, provides assistance to state and private landowners, and maintains the largest forestry research organization in the world. Public lands the Forest Service manages contribute more than \$13 billion to the economy each year through visitor spending alone. Those same lands provide 20 percent of the nation's clean water supply, a value estimated at \$27 billion per year. The agency has either a direct or indirect role in stewardship of about 80 percent of the 850 million forested acres within the U.S., of which 100 million acres are urban forests where most Americans live.

Appendix – Part II: The 2013 Aerial Detection Survey Summary for the Rocky Mountain Region (R2) of the US Forest Service



Spruce Beetle – San Juan National Forest; east of Lake San Cristobal, CO. 2013. Picture of the US Forest Service logo below in the left ccorner. Photo credit: Justin Backsen

For more information or additional data requests, please contact:



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Table of Contents

Introduction	3
Interpreting the Tables	4
Acres Affected by Mountain Pine Beetle by Host Species	
State	6
Colorado Counties	7
Nebraska Counties	13
South Dakota Counties	13
Wyoming Counties (R2 Only)	14
National Forests	17
Acres Affected by Spruce Beetle	
State	20
Colorado Counties	20
Wyoming Counties (R2 Only)	21
National Forests	22
Acres Affected by Douglas-fir Beetle	
State	23
Colorado Counties	23
Wyoming Counties (R2 Only)	24
National Forests	25
Acres Affected by Western Balsam Bark Beetle	

State	26
Colorado Counties	26
Wyoming Counties (R2 Only)	27
National Forests	28

Acres Affected by Western Spruce Budworm

State	29
Colorado Counties	29
Wyoming Counties (R2 Only)	30
National Forests	30

Acres Affected by Aspen Dieback and Mortality

State	31
Colorado Counties	31
Wyoming Counties (R2 Only)	31
South Dakota Counties	31
National Forests	31

Introduction:

Due to the difficulty in developing “Data Tables” that meet the “ 508 Compliant” guidelines.. We can provide all tables in this report in a different format for anyone who is visually - challenged and desires to see the data tables (pages 5 – 31).

Acreage figures are rounded as follows:

$X < 10$ acres- to the nearest acre

$10 < X < 1,000$ acres- to the nearest 10 acres

$1,000 < X < 10,000$ acres- to the nearest 100 acres

$X > 10,000$ acres- to the nearest 1,000 acres

These tables provide summaries for the major damage agents detected in the 2013 aerial detection survey for the Rocky Mountain Region (R2) of the Forest Service.

Counties or National Forests that have zero mapped acres for all categories in the tables are omitted.

Wyoming acres include only acres within the R2 portion of Wyoming. The acres for Fremont, Park, Sublette, Teton counties include only the portion of the county which falls in R2.

CO plus S.WY numbers include all of Colorado and the six Wyoming counties that encompass the Medicine Bow NF: Albany, Carbon, Converse, Laramie, Natrona, and Platte.

Certain calculations using these data should be avoided. Adding numbers from different categories in an attempt to produce a total of acres impacted by multiple agents, for

example will produce inaccurate, inflated results because acres experiencing multiple damages are double-counted. Producing totals for multiple agents is a separate GIS exercise.

Caution should be exercised when making year to year comparisons using these data, the survey area is not identical from year to year and extent flown each year may not equal 100 % of the forested acres in a given area. A GIS dataset of area flown is available and provides information on the spatial extent of the aerial survey for a particular year.

The county summaries include all ownerships within the county boundary. National Forest summaries are based on the Forest's proclamation boundary and include inholdings of all ownership types.

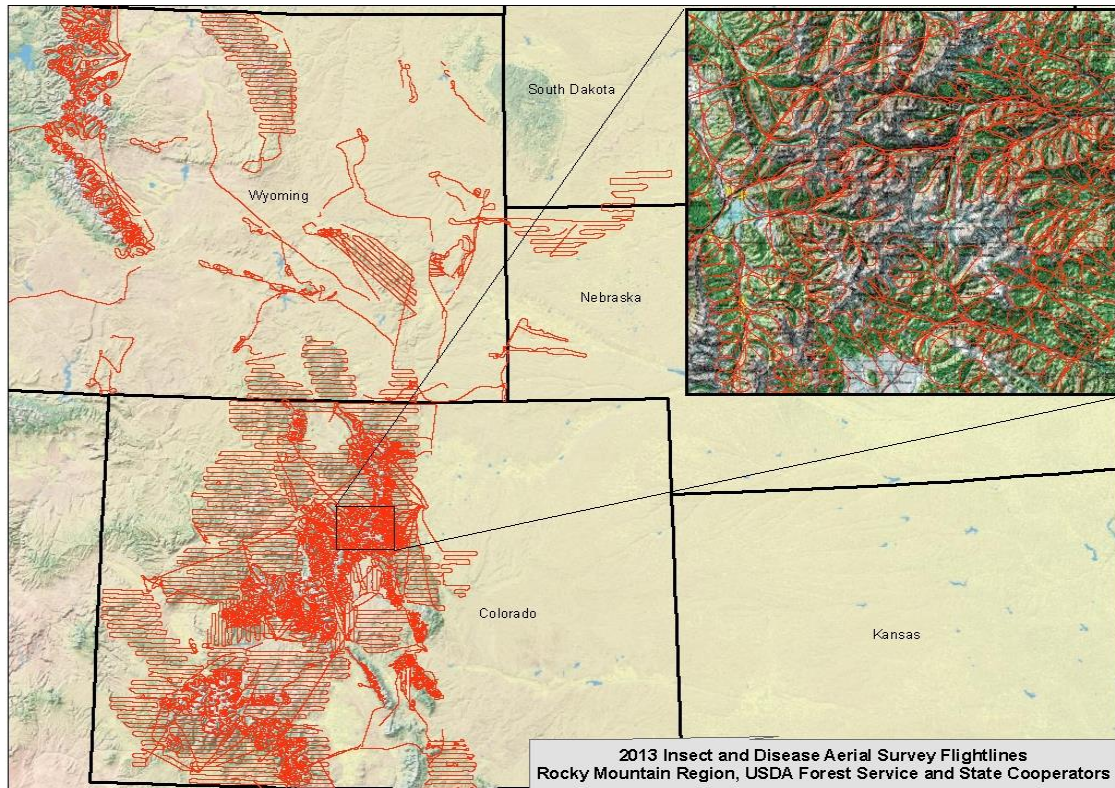
Interpreting the 2013 Aerial Detection Survey Summary Tables

The 2013 aerial detection survey summary tables for the Rocky Mountain Region of the USDA Forest Service have been prepared to answer the majority of questions concerning the aerial survey data and to provide consistent answers to questions from our clients. Raw GIS files are available for analysis; however minor differences in query structure can result in multiple “correct” answers to the same question. Therefore the numbers provided in these tables are to be considered final. The numbers reported here are the results of GIS queries that remain consistent from year to year. In these tables, the major forest pests that were detected in the region’s forests are summarized by state, county, and national forest. County totals include all ownerships within a counties’ boundary. Forest totals include all acres within the forest’s proclamation boundary.

For bark beetles including mountain pine beetle, spruce beetle and Douglas-fir beetle the aerial survey tables provide the number of acres where some level of trees were detected that were currently dying (fading) from bark beetle attack. Fading occurs one year after initial attack so trees mapped in a given year were killed by bark beetles the previous year. Information from the prior year (2012 Acres Affected) is also provided to assess the trend of the epidemic over the last year in a given area. Because bark beetles may be active in an area for multiple years there is considerable overlap of acres from year to year. Cumulative acres affected since 1996 through the current and through the prior year are provided to determine the area affected by the ongoing epidemic. By subtracting the current cumulative acres (1996-2013 Cumulative Acres Affected) for a given area from the prior year’s cumulative acres (1996-2012 Cumulative Acres Affected) for that area, the expansion of the beetle epidemic onto new (not previously mapped) acres can be determined. .

For western balsam bark beetle and associated subalpine fir disease problems, western spruce budworm, aspen defoliation, and aspen dieback and mortality caused by a combination of insects and diseases only the current and prior years acres detected are provided. For these pests, general trend information about the population of the insect or disease affects can be determined by comparing acres affected with the prior year.

There are several small updates to the prior year’s numbers (2012) in the table due to the results of ground checking and additional data received after the release of the 2013 tables.



Gray and Green – Old mountain pine beetle caused mortality on the Arapaho National Forest; east of East Branch Reservoir, CO. 2013. Photo credit: Justin Backsen

2013 Mountain Pine Beetle Activity

States	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Colorado				
Lodgepole Pine	118,000	73,000	2,605,000	2,607,000
Ponderosa Pine	170,000	32,000	950,000	957,000
5-Needle Pines	2,300	2,200	122,000	124,000
All Hosts	264,000	97,000	3,359,000	3,367,000
Wyoming – R2				
Lodgepole Pine	66,000	13,000	1,113,000	1,118,000
Ponderosa Pine	13,000	3,600	186,000	188,000
5-Needle Pines	79,000	44,000	964,000	979,000
All Hosts	129,000	54,000	1,976,000	1,992,000
CO plus S. WY				
Lodgepole Pine	134,000	75,000	3,324,000	3,329,000
Ponderosa Pine	182,000	35,000	1,061,000	1,069,000
5-Needle Pines	27,000	4,000	267,000	270,000
All Hosts	314,000	101,000	4,265,000	4,274,000
South Dakota				
Ponderosa Pine	30,000	33,000	400,000	414,000
5-Needle Pines	0	0	0	0
All Hosts	30,000	33,000	400,000	414,000

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Nebraska				
Ponderosa Pine	9	140	310	460
5-Needle Pines	0	0	1	1
All Hosts	9	140	320	460

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Adams	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	1	1
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	1	1
Alamosa	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	430	430
	5-Needle Pines	0	0	10	10
	All Hosts	0	0	430	430
Archuleta	Lodgepole Pine	0	0	3	3
	Ponderosa Pine	0	2	16,000	16,000
	5-Needle Pines	0	0	0	0
	All Hosts	0	2	16,000	16,000
Boulder	Lodgepole Pine	5,700	1,400	110,000	111,000
	Ponderosa Pine	5,100	280	69,000	69,000
	5-Needle Pines	160	50	16,000	16,000
	All Hosts	9,500	1,600	140,000	140,000
Chaffee	Lodgepole Pine	2	0	5,600	5,600
	Ponderosa Pine	20	2	77,000	77,000
	5-Needle Pines	0	0	1,700	1,700

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	All Hosts	20	2	83,000	83,000
Clear Creek	Lodgepole Pine	440	240	76,000	77,000
	Ponderosa Pine	8	1	8,900	8,900
	5-Needle Pines	30	20	9,400	9,400
	All Hosts	480	250	82,000	82,000
Conejos	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	4,800	4,800
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	4,800	4,800

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Costilla	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	4,600	4,600
	5-Needle Pines	0	0	7	7
	All Hosts	0	0	4,600	4,600
Custer	Lodgepole Pine	0	0	160	160
	Ponderosa Pine	0	0	35,000	35,000
	5-Needle Pines	5	40	860	900
	All Hosts	5	40	35,000	35,000
Delta	Lodgepole Pine	0	0	2	2
	Ponderosa Pine	0	0	6	6
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	8	8
Dolores	Lodgepole Pine	330	0	330	330
	Ponderosa Pine	120	3	680	680
	5-Needle Pines	0	0	0	0
	All Hosts	450	3	1,000	1,000
Douglas	Lodgepole Pine	0	0	270	270
	Ponderosa Pine	100	500	34,000	34,000
	5-Needle Pines	0	0	0	0
	All Hosts	100	500	34,000	34,000

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Eagle	Lodgepole Pine	11,000	3,700	189,000	190,000
	Ponderosa Pine	10	0	4,600	4,600
	5-Needle Pines	0	0	190	190
	All Hosts	11,000	3,700	193,000	194,000
El Paso	Lodgepole Pine	0	0	2	2
	Ponderosa Pine	10	40	13,000	13,000
	5-Needle Pines	0	0	0	0
	All Hosts	10	40	13,000	13,000

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Elbert	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	1	100	430	540
	5-Needle Pines	0	0	0	0
	All Hosts	1	100	430	540
Fremont	Lodgepole Pine	0	0	170	170
	Ponderosa Pine	5	20	32,000	32,000
	5-Needle Pines	70	230	2,000	2,200
	All Hosts	70	240	34,000	34,000
Garfield	Lodgepole Pine	1,100	2	11,000	11,000
	Ponderosa Pine	0	0	60	60
	5-Needle Pines	30	0	510	510
	All Hosts	1,100	2	11,000	11,000
Gilpin	Lodgepole Pine	210	40	52,000	52,000
	Ponderosa Pine	7	4	10,000	10,000
	5-Needle Pines	30	8	16,000	16,000
	All Hosts	250	60	56,000	56,000
Grand	Lodgepole Pine	490	40	579,000	579,000
	Ponderosa Pine	0	0	500	500
	5-Needle Pines	0	3	3,700	3,700
	All Hosts	490	40	581,000	581,000

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Gunnison	Lodgepole Pine	0	0	2,800	2,800
	Ponderosa Pine	0	3	1,400	1,400
	5-Needle Pines	1	0	2	2
	All Hosts	1	3	4,200	4,200
Hinsdale	Lodgepole Pine	0	0	3	3
	Ponderosa Pine	0	0	3,200	3,200
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	3,200	3,200

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Huerfano	Lodgepole Pine	0	0	50	50
	Ponderosa Pine	0	0	26,000	26,000
	5-Needle Pines	0	0	220	220
	All Hosts	0	0	26,000	26,000
Jackson	Lodgepole Pine	540	60	362,000	362,000
	Ponderosa Pine	0	0	1,200	1,200
	5-Needle Pines	0	0	13,000	13,000
	All Hosts	540	60	364,000	364,000
Jefferson	Lodgepole Pine	30	220	7,800	8,000
	Ponderosa Pine	30	120	29,000	29,000
	5-Needle Pines	0	0	300	300
	All Hosts	50	340	35,000	35,000
La Plata	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	5	12,000	12,000
	5-Needle Pines	0	0	0	0
	All Hosts	0	5	12,000	12,000
Lake	Lodgepole Pine	3	0	11,000	11,000
	Ponderosa Pine	0	0	320	320
	5-Needle Pines	5	0	570	570
	All Hosts	8	0	11,000	11,000

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Larimer	Lodgepole Pine	90,000	67,000	580,000	582,000
	Ponderosa Pine	164,000	27,000	377,000	380,000
	5-Needle Pines	2,000	1,500	56,000	57,000
	All Hosts	232,000	85,000	807,000	808,000
Las Animas	Lodgepole Pine	0	0	10	10
	Ponderosa Pine	0	20	12,000	12,000
	5-Needle Pines	0	0	6	6
	All Hosts	0	20	12,000	13,000

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Mesa	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	50	260	5,700	5,900
	5-Needle Pines	0	0	0	0
	All Hosts	50	260	5,700	5,900
Mineral	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	840	840
	5-Needle Pines	0	0	3	3
	All Hosts	0	0	840	840
Moffat	Lodgepole Pine	4	0	16,000	16,000
	Ponderosa Pine	0	0	440	440
	5-Needle Pines	0	0	100	100
	All Hosts	4	0	16,000	16,000
Montezuma	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	690	690
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	690	690
Montrose	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	130	380	2,600	3,000
	5-Needle Pines	0	0	0	0
	All Hosts	130	380	2,600	3,000

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Ouray	Lodgepole Pine	0	0	5	5
	Ponderosa Pine	50	1,500	290	1,800
	5-Needle Pines	0	0	0	0
	All Hosts	50	1,500	300	1,800
Park	Lodgepole Pine	220	60	47,000	47,000
	Ponderosa Pine	40	900	90,000	91,000
	5-Needle Pines	5	20	410	430
	All Hosts	260	980	137,000	137,000

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Pitkin	Lodgepole Pine	200	70	22,000	22,000
	Ponderosa Pine	0	0	90	90
	5-Needle Pines	0	0	4	4
	All Hosts	200	70	22,000	22,000
Pueblo	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	21,000	21,000
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	21,000	21,000
Rio Blanco	Lodgepole Pine	7,200	2	44,000	44,000
	Ponderosa Pine	0	0	40	40
	5-Needle Pines	0	0	100	100
	All Hosts	7,200	2	44,000	44,000
Rio Grande	Lodgepole Pine	0	4	0	4
	Ponderosa Pine	0	0	3,400	3,400
	5-Needle Pines	0	0	0	0
	All Hosts	0	4	3,400	3,400
Routt	Lodgepole Pine	430	80	345,000	345,000
	Ponderosa Pine	0	0	390	390
	5-Needle Pines	0	0	540	540
	All Hosts	430	80	345,000	345,000

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Saguache	Lodgepole Pine	0	0	790	790
	Ponderosa Pine	0	0	39,000	39,000
	5-Needle Pines	10	300	350	640
	All Hosts	10	300	40,000	40,000
San Miguel	Lodgepole Pine	0	0	10	10
	Ponderosa Pine	120	1,100	3,000	4,000
	5-Needle Pines	0	0	10	10
	All Hosts	120	1,100	3,100	4,000

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Colorado County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Summit	Lodgepole Pine	370	0	142,000	142,000
	Ponderosa Pine	0	0	40	40
	5-Needle Pines	2	0	630	630
	All Hosts	370	0	143,000	143,000
Teller	Lodgepole Pine	0	0	10	10
	Ponderosa Pine	40	60	9,800	9,800
	5-Needle Pines	0	0	20	20
	All Hosts	40	60	9,800	9,900

Nebraska County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Banner	Ponderosa Pine	3	80	150	230
Dawes	Ponderosa Pine	0	0	20	20
Morrill	Ponderosa Pine	0	5	4	9
Scotts Bluff	Ponderosa Pine	5	60	110	170
Sheridan	Ponderosa Pine	0	0	20	20
	5-Needle	0	0	1	1
	All Hosts	0	0	20	20

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South Dakota County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Butte	Ponderosa Pine	0	0	120	120
Custer	Ponderosa Pine	3,400	3,900	46,000	49,000
Fall River	Ponderosa Pine	0	0	1,400	1,400
Lawrence	Ponderosa Pine	11,000	7,100	145,000	148,000
Meade	Ponderosa Pine	140	60	26,000	26,000
Pennington	Ponderosa Pine	16,000	22,000	181,000	190,000

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Wyoming County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Albany	Lodgepole Pine	5,600	1,900	212,000	214,000
	Ponderosa Pine	6,900	1,700	69,000	70,000
	5-Needle Pines	830	920	57,000	57,000
	All Hosts	12,000	2,600	295,000	296,000
Big Horn	Lodgepole Pine	4	0	1,500	1,500
	Ponderosa Pine	0	0	1,200	1,200
	5-Needle Pines	0	4	21,000	22,000
	All Hosts	4	4	24,000	24,000
Campbell	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	8	3	180	190
	5-Needle Pines	0	0	0	0
	All Hosts	8	3	180	190
Carbon	Lodgepole Pine	8,700	290	495,000	495,000
	Ponderosa Pine	650	20	14,000	14,000
	5-Needle Pines	12,000	170	39,000	39,000
	All Hosts	21,000	480	527,000	527,000
Converse	Lodgepole Pine	1,100	210	8,200	8,300
	Ponderosa Pine	400	130	5,400	5,600
	5-Needle Pines	80	6	4,800	4,800
	All Hosts	1,400	240	17,000	17,000

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Crook	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	610	620	32,000	33,000
	5-Needle Pines	0	0	0	0
	All Hosts	610	620	32,000	33,000
Fremont	Lodgepole Pine	37,000	8,900	268,000	270,000
	Ponderosa Pine	10	5	1,400	1,400
	5-Needle Pines	46,000	38,000	368,000	380,000
	All Hosts	58,000	43,000	475,000	486,000
Goshen	Lodgepole Pine	0	0	10	10
	Ponderosa Pine	4	5	80	80
	5-Needle Pines	0	0	0	0
	All Hosts	4	5	90	90

Wyoming County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Hot Springs	Lodgepole Pine	3,600	0	9,600	9,600
	Ponderosa Pine	0	0	860	860
	5-Needle Pines	1,300	0	43,000	43,000
	All Hosts	4,700	0	49,000	49,000
Johnson	Lodgepole Pine	0	0	3,600	3,600
	Ponderosa Pine	50	20	22,000	22,000
	5-Needle Pines	7	20	35,000	35,000

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	All Hosts	60	40	59,000	59,000
Laramie	Lodgepole Pine	0	3	20	20
	Ponderosa Pine	3,200	260	14,000	14,000
	5-Needle Pines	40	0	1,100	1,100
	All Hosts	3,200	260	14,000	15,000
Natrona	Lodgepole Pine	70	30	3,600	3,600
	Ponderosa Pine	150	30	5,100	5,200
	5-Needle Pines	11,000	730	43,000	43,000
	All Hosts	11,000	800	49,000	49,000
Niobrara	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	50	7	160	170
	5-Needle Pines	0	0	0	0
	All Hosts	50	7	160	170
Park	Lodgepole Pine	7,600	800	103,000	103,000
	Ponderosa Pine	0	0	40	40
	5-Needle Pines	5,700	2,600	313,000	314,000
	All Hosts	12,000	3,400	369,000	371,000
Platte	Lodgepole Pine	30	330	70	400
	Ponderosa Pine	570	400	2,900	2,900
	5-Needle Pines	340	0	460	460
	All Hosts	600	400	3,000	3,100

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Wyoming County	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Sheridan	Lodgepole Pine	0	200	2,100	2,300
	Ponderosa Pine	370	240	6,800	6,900
	5-Needle Pines	9	20	2,600	2,600
	All Hosts	380	470	11,000	12,000
Sublette	Lodgepole Pine	130	0	270	270
	Ponderosa Pine	0	0	0	0
	5-Needle Pines	650	430	2,100	2,200
	All Hosts	650	430	2,100	2,200
Sweetwater	Lodgepole Pine	2,400	0	2,400	2,400
	Ponderosa Pine	0	0	0	0
	5-Needle Pines	690	1,100	690	1,500
	All Hosts	3,000	1,100	3,000	3,900
Teton	Lodgepole Pine	0	0	390	390
	Ponderosa Pine	0	0	0	0
	5-Needle Pines	0	0	2,400	2,400
	All Hosts	0	0	2,400	2,400
Washakie	Lodgepole Pine	0	4	2,200	2,200
	Ponderosa Pine	2	1	1,800	1,800
	5-Needle Pines	7	80	32,000	32,000
	All Hosts	9	80	35,000	35,000

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Weston	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	120	140	8,200	8,300
	5-Needle Pines	0	0	0	0
	All Hosts	120	140	8,200	8,300

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National Forest	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Arapaho National Forest	Lodgepole Pine	400	140	453,000	453,000
	Ponderosa Pine	3	1	3,500	3,500
	5-Needle Pines	30	20	12,000	12,000
	All Hosts	430	160	456,000	456,000
Bighorn National Forest	Lodgepole Pine	4	200	5,400	5,600
	Ponderosa Pine	160	100	6,200	6,200
	5-Needle Pines	10	20	15,000	15,000
	All Hosts	170	320	26,000	26,000
Black Hills National Forest	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	31,000	34,000	416,000	430,000
	5-Needle Pines	0	0	0	0
	All Hosts	31,000	34,000	416,000	430,000
Grand Mesa National Forest	Lodgepole Pine	0	0	2	2
	Ponderosa Pine	0	0	10	10
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	20	20
Gunnison National Forest	Lodgepole Pine	0	0	3,400	3,400
	Ponderosa Pine	0	0	2,100	2,100
	5-Needle Pines	4	0	4	4

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	All Hosts	4	0	5,500	5,500
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National Forest	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Medicine Bow National Forest	Lodgepole Pine	7,500	2,200	638,000	639,000
	Ponderosa Pine	5,500	1,500	40,000	40,000
	5-Needle Pines	1,100	650	35,000	36,000
	All Hosts	13,000	2,700	680,000	680,000
Nebraska National Forest	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	0	0	20	20
	5-Needle Pines	0	0	0	0
	All Hosts	0	0	20	20
Pike National Forest	Lodgepole Pine	230	60	47,000	47,000
	Ponderosa Pine	150	930	101,000	102,000
	5-Needle Pines	4	20	300	320
	All Hosts	380	1,000	148,000	149,000
Rio Grande National Forest	Lodgepole Pine	0	4	90	90
	Ponderosa Pine	0	0	35,000	35,000
	5-Needle Pines	7	210	310	520
	All Hosts	7	220	36,000	36,000
Roosevelt National Forest	Lodgepole Pine	85,000	56,000	610,000	612,000
	Ponderosa Pine	150,000	26,000	371,000	374,000
	5-Needle Pines	1,800	1,100	64,000	65,000
	All Hosts	213,000	74,000	808,000	810,000

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Routt National Forest	Lodgepole Pine	860	110	611,000	611,000
	Ponderosa Pine	0	0	350	350
	5-Needle Pines	0	0	10,000	10,000
	All Hosts	860	110	613,000	613,000
San Isabel National Forest	Lodgepole Pine	6	0	13,000	13,000
	Ponderosa Pine	20	10	134,000	134,000
	5-Needle Pines	80	270	5,200	5,400
	All Hosts	100	280	151,000	151,000

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National Forest	Host Tree	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
San Juan National Forest	Lodgepole Pine	330	0	330	330
	Ponderosa Pine	120	3	28,000	28,000
	5-Needle Pines	0	0	3	3
	All Hosts	450	3	28,000	28,000
Shoshone National Forest	Lodgepole Pine	36,000	6,600	276,000	278,000
	Ponderosa Pine	0	0	40	40
	5-Needle Pines	33,000	31,000	533,000	543,000
	All Hosts	50,000	35,000	663,000	672,000
Thunder Basin National Grassland	Lodgepole Pine	0	0	0	0
	Ponderosa Pine	80	2	300	300
	5-Needle Pines	0	0	0	0
	All Hosts	80	2	300	300
Uncompahgre National Forest	Lodgepole Pine	0	0	20	20
	Ponderosa Pine	330	1,600	8,500	9,900
	5-Needle Pines	0	0	0	0
	All Hosts	330	1,600	8,500	9,900
White River National Forest	Lodgepole Pine	19,000	3,700	381,000	382,000
	Ponderosa Pine	3	0	3,600	3,600
	5-Needle Pines	30	0	1,400	1,400
	All Hosts	19,000	3,700	385,000	386,000

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2013 Spruce Beetle Activity

	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Colorado	326,000*	398,000	928,000*	1,144,000
Wyoming – R2	29,000	28,000	490,000	504,000
CO plus S.WY	335,000*	404,000	1,045,000*	1,262,000
South Dakota	0	0	100	100

Colorado County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Alamosa	0	2	0	2
Archuleta	5,100	26,000	12,000	33,000
Boulder	0	0	50	50
Chaffee	0	30	60	90
Clear Creek	0	7	40	40
Conejos	23,000	51,000	33,000	62,000
Costilla	0	140	1,500	1,600
Custer	1,100	3,700	2,100	5,100
Delta	18,000*	5,500	27,000*	28,000
Dolores	6,500	10,000	10,000	20,000

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Douglas	0	0	20	20
Eagle	50	0	5,900	5,900
El Paso	0	0	10	10
Fremont	80	2,300	170	2,400
Garfield	50	80	4,200	4,200
Gilpin	0	1	20	30
Grand	12,000	15,000	24,000	32,000
Gunnison	300	670	21,000	22,000
Hinsdale	60,000	79,000	144,000	186,000

*Numbers revised since previous table release

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Colorado County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Huerfano	330	1,900	1,900	3,400
Jackson	3,700	9,100	76,000	82,000
Jefferson	0	0	80	80
La Plata	280	5,300	11,000	16,000
Lake	0	0	50	50
Larimer	16,000	16,000	56,000	61,000
Las Animas	0	6	650	660
Mesa	26,000*	13,000	43,000*	46,000
Mineral	54,000	39,000	221,000	232,000
Moffat	0	0	750	750
Montezuma	970	2,700	3,100	5,600
Montrose	2	0	560	560
Ouray	0	0	1,400	1,400
Park	1	2	40	50
Pitkin	2,000	1,900	8,000	8,400
Pueblo	120	370	2,300	2,400
Rio Blanco	0	0	3,800	3,800
Rio Grande	29,000	42,000	48,000	69,000
Routt	1,200	60	85,000	85,000
Saguache	64,000	64,000	72,000	108,000

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San Juan	1,100	7,000	4,900	10,000
San Miguel	1	2,100	950	3,100
Summit	20	0	1,300	1,300

Wyoming County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Albany	4,200	940	29,000	29,000
Big Horn	450	20	12,000	12,000

*Numbers revised since previous table release

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Wyoming County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Carbon	4,900	5,500	88,000	89,000
Converse	0	0	80	80
Fremont	6,400	20,000	62,000	73,000
Hot Springs	9,100	0	19,000	19,000
Johnson	0	9	4,400	4,400
Natrona	0	2	40	40
Park	2,800	1,500	269,000	270,000
Sheridan	770	290	6,300	6,500
Sublette	0	0	200	200
Sweetwater	3	0	3	3
Teton	60	470	1,100	1,300
Washakie	0	0	670	670

National Forest	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Arapaho National Forest	8,300	12,000	19,000	25,000
Bighorn National Forest	1,200	320	22,000	23,000
Black Hills National Forest	0	0	100	100
Grand Mesa National Forest	32,000*	13,000	51,000*	54,000

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Gunnison National Forest	50,000*	34,000	76,000*	96,000
Medicine Bow National Forest	8,700	6,400	114,000	116,000
Pike National Forest	1	2	60	60
Rio Grande National Forest	165,000	205,000	378,000	476,000
Roosevelt National Forest	10,000	11,000	43,000	46,000
Routt National Forest	4,900	9,100	161,000	167,000
San Isabel National Forest	1,700	8,600	6,800	14,000
San Juan National Forest	39,000	75,000	130,000	183,000
Shoshone National Forest	13,000	21,000	305,000	317,000
Uncompahgre National Forest	30	2,200	7,700	9,900
White River National Forest	3,000	3,300	24,000	25,000

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2013 Douglas-fir Beetle Activity

State	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Colorado	28,000*	43,000	341,000	374,000
Wyoming – R2	800	760	327,000	328,000
CO plus S. WY	28,000	43,000	356,000	389,000

Colorado County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Alamosa	0	60	20	80
Archuleta	2,100	1,800	36,000	37,000
Boulder	0	0	280	280
Chaffee	80	60	3,000	3,000
Clear Creek	0	0	1,100	1,100
Conejos	120	40	5,900	5,900
Costilla	240	570	1,900	2,400
Custer	30	90	6,300	6,400
Delta	200*	330	3,300*	3,500
Dolores	320	640	4,000	4,300
Douglas	5,000	7,700	39,000	44,000
Eagle	990	890	7,800	8,500

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El Paso	110	130	4,700	4,800
Elbert	1	0	1	1
Fremont	380	280	15,000	15,000
Garfield	1,700	2,300	28,000	29,000
Gilpin	0	0	60	60
Grand	100	150	1,000	1,200
Gunnison	4,200*	3,900	23,000	26,000
Hinsdale	1,300	1,400	10,000	11,000

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Colorado County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Huerfano	0	150	2,100	2,200
Jackson	110	10	530	540
Jefferson	700	970	9,700	10,000
La Plata	710	1,800	13,000	14,000
Lake	0	30	80	110
Larimer	0	0	2,500	2,500
Las Animas	10	0	5,900	5,900
Mesa	580*	1,000	7,000*	7,800
Mineral	1,700	570	9,600	9,900
Moffat	0	0	970	970
Montezuma	60	80	7,800	7,900
Montrose	1,900	1,300	7,600	8,700
Ouray	1,400	8,800	4,200	12,000
Park	20	40	1,600	1,600
Pitkin	610	3,900	5,900	8,900
Pueblo	0	0	3,700	3,700
Rio Blanco	370	380	8,000	8,400
Rio Grande	300	200	8,100	8,300
Routt	240	240	4,400	4,600
Saguache	760	960	31,000	32,000

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San Juan	210	1,400	410	1,700
San Miguel	1,100	380	15,000	16,000
Summit	100	30	480	500
Teller	70	90	1,700	1,800

Wyoming County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Albany	60	3	5,400	5,400
Big Horn	110	30	33,000	33,000
Carbon	280	4	9,200	9,200

*Numbers revised since previous table release

Wyoming County	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Converse	0	2	10	10
Crook	0	0	1	1
Fremont	90	20	49,000	49,000
Hot Springs	0	0	26,000	26,000
Johnson	2	6	1,500	1,500
Natrona	0	4	150	160
Park	70	50	196,000	196,000
Sheridan	2	10	980	990

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Sweetwater	160	620	160	670
Washakie	20	4	6,200	6,300

National Forest	2012 Acres Affected	2013 Acres Affected	1996-2012 Cumulative Acres Affected	1996-2013 Cumulative Acres Affected
Arapaho National Forest	3	3	500	500
Bighorn National Forest	90	30	27,000	27,000
Grand Mesa National Forest	130*	180	1,900*	2,000
Gunnison National Forest	3,700*	2,500	21,000	23,000
Medicine Bow National Forest	80	0	12,000	12,000
Pike National Forest	5,200	7,500	45,000	50,000
Rio Grande National Forest	640	400	37,000	38,000
Roosevelt National Forest	0	0	1,800	1,800
Routt National Forest	10	110	2,100	2,200
San Isabel National Forest	150	170	16,000	16,000
San Juan National Forest	6,200	7,200	70,000	75,000
Shoshone National Forest	70	60	204,000	204,000
Uncompahgre National Forest	3,100	8,900	17,000	25,000
White River National Forest	2,300	5,900	19,000	24,000

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2013 Western Balsam Bark Beetle Activity

State	2012 Acres Affected	2013 Acres Affected
Colorado	221,000	178,000
Wyoming – R2	14,000	24,000
CO plus S.WY	224,000	181,000

Colorado County	2012 Acres Affected	2013 Acres Affected
Alamosa	30	80
Archuleta	160	0
Boulder	3,200	4,000
Chaffee	1,600	1,500
Clear Creek	2,700	7,200
Conejos	1,600	130
Costilla	4,600	2,700
Custer	3,500	2,100
Delta	5,700*	3,500
Dolores	3,400	7,300
Eagle	14,000	13,000
Fremont	100	160
Garfield	17,000	15,000

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Gilpin	2,300	2,900
Grand	14,000	12,000
Gunnison	35,000	21,000
Hinsdale	4,100	1,100
Huerfano	2,900	2,800
Jackson	2,500	2,000
Jefferson	5	7
La Plata	280	830
Lake	1,400	2,500
Larimer	12,000	4,500
Las Animas	3,200	1,300

*Numbers revised since previous table release

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Colorado County	2012 Acres Affected	2013 Acres Affected
Mesa	6,400	8,900
Mineral	1,200	290
Moffat	360	710
Montezuma	50	400
Montrose	270	320
Ouray	1,500	2,600
Park	9,600	8,800
Pitkin	25,000	16,000
Rio Blanco	18,000	13,000
Rio Grande	830	0
Routt	4,500	4,300
Saguache	6,500	1,200
San Juan	1,400	3,100
San Miguel	4,600	4,000
Summit	6,000	7,200
Teller	0	6

Wyoming County	2012 Acres Affected	2013 Acres Affected
Albany	660	950

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Big Horn	950	2,000
Carbon	2,000	2,300
Converse	50	100
Fremont	1,500	6,000
Hot Springs	3	0
Johnson	2,300	5,800
Natrona	210	380
Park	3,700	1,400
Sheridan	740	850
Sweetwater	1,800	4,000
Washakie	9	3

National Forest	2012 Acres Affected	2013 Acres Affected
Arapaho National Forest	14,000	17,000
Bighorn National Forest	4,000	8,600
Grand Mesa National Forest	6,700*	8,900
Gunnison National Forest	32,000	18,000
Medicine Bow National Forest	2,100	3,100

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Pike National Forest	10,000	9,100
Rio Grande National Forest	5,500	600
Roosevelt National Forest	12,000	7,200
Routt National Forest	14,000	11,000
San Isabel National Forest	11,000	9,500
San Juan National Forest	5,000	10,000
Shoshone National Forest	5,100	5,300
Uncompahgre National Forest	11,000	9,900
White River National Forest	75,000	59,000

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2013 Western Spruce Budworm Activity

State	2012 Acres Affected	2013 Acres Affected
Colorado	217,000	156,000
Wyoming- R2	16,000	26,000
CO plus S.WY	217,000	156,000

Colorado County	2012 Acres Affected	2013 Acres Affected
Alamosa	1,600	310
Archuleta	7,100	1,000
Chaffee	2	0
Conejos	890	290
Costilla	27,000	30,000
Custer	12,000	15,000
Dolores	15,000	6,800
El Paso	40	0
Fremont	3,300	300
Grand	20	30
Gunnison	170	0
Hinsdale	3,100	1,300
Huerfano	37,000	22,000
Jackson	80	0

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La Plata	14,000	17,000
Las Animas	31,000	27,000
Mineral	540	0
Montezuma	6,300	10,000
Ouray	490	80
Pueblo	2,300	2,900
Rio Grande	60	0
Routt	380	50
Saguache	35,000	8,900
San Juan	15,000	12,000
San Miguel	5,600	540
Teller	950	560

Wyoming County	2012 Acres Affected	2013 Acres Affected
Albany	40	0
Carbon	30	0
Fremont	3,900	1,100
Johnson	0	20
Park	12,000	24,000
Washakie	110	470

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National Forest	2012 Acres Affected	2013 Acres Affected
Gunnison National Forest	170	0
Medicine Bow National Forest	6	0
Pike National Forest	390	280
Rio Grande National Forest	35,000	7,700
Routt National Forest	380	50
San Isabel National Forest	44,000	33,000
San Juan National Forest	54,000	47,000
Shoshone National Forest	15,000	25,000
Uncompahgre National Forest	5,800	620

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2013 Aspen Dieback and Mortality

	Acres Affected
Colorado	1,200
Wyoming – R2	1,500
CO. plus S. WY	2,600
South Dakota	0

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Colorado County	2013 Acres Affected
Delta	60
Garfield	10
Grand	50
Gunnison	180
Jackson	60
La Plata	30
Mesa	190
Moffat	60
Montrose	80
Ouray	10
Rio Blanco	10
Routt	390
San Miguel	10
Summit	6

Wyoming County	2013 Acres Affected
Carbon	1,500
Natrona	30

South Dakota County	2013 Acres Affected
Pennington	0

National Forest	2013 Acres Affected
Grand Mesa National Forest	9
Gunnison National Forest	120
Routt National Forest	160
Uncompahgre National Forest	200
White River National Forest	30

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